40 Rock

POPULAR
Computing
WEEKLY

35p 4 November 1982 Vol 1 No 29

This Week

New Dragon page

Starting this week a regular page for Dragon 32 programming skills See page 25

Schools software

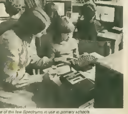
How many of the advertised programs are good enough for you? Find out in our review of ZX81 educational software on page 12

Guy Fawkes

Pit your wits against the guards in this year model game for the ZX Spectrum See page 8

Vic20 ZX81 BBC Spectrum programs and games in *Open Forum* See page 14

News Desk



Some of the few Spectrums in use in primary schools

Spectrum shunned in education scheme

THE Sinclair Spectrum will receive only limited use in primary schools according to information just received

Since the Department of Industry announced its Micros in Primaries grants scheme in July it has received 422 applications. Of these 322 are for the Acorn BBC Model B, 97 for the Research Machines 480Z and only three for the Sinclair Spectrum

Most local education authorities have issued guidelines to their schools indicating which of the three machines in the scheme should be adopted

US launch for BBC micro in Spring '83

ACORN plans to launch the BBC range of microcomputers in the USA in the first quarter of 1983

The machines were shown there for the first time at the Info '82 trade exhibition, held at the Coliseum New York on October 11-14

The go-ahead to exhibit at the show came after the decision to set up an American office to market the Acorn computers "Chris Curry and John Coll went over to the show to make initial market contacts and to sort out a dealership network for the BBC machines" explained Acorn's Jane Aldrich US prices have not yet been finalised as they will be subject to discussions with whoever will become the distributor

The production difficulties which have plagued the machine's progress in the UK seem finally to have been solved allowing the American launch to be contemplated It is only in the last two months that the micros have been freely available through Acorn dealers in Britain

Continued on page 28

POPULAR Computing WEEKLY

4 November 1982 Vol 1 No 29

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London WC2
Telephone **01-839 6835**

Published by Sunshine Publications Ltd

Typesetting, origination and printing by Chesham Press Chesham Bucks

Distributed by S M Distribution
London SW9 01-274 8611 Telex 261643

Subscriptions
You can have *Popular Computing Weekly* sent to your home the subscription rate is **£19.95** per year for addresses in the UK **£37.40** overseas

How to submit articles
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All submissions should be typed and a double space should be left between each line Please leave wide margins

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Accuracy
Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish although we will always try our best to make sure programs work.

This Week

Editorial

Clive Sinclair is in grave danger of becoming The Yesterday Man The ZX Spectrum, which was widely expected to become the market leader when it was first launched in April is already being overtaken by the Dragon 32

The Spectrum s eclipse is not due to any technical pre-eminence on the part of Dragon Pound for pound the Spectrum still offers one of the best deals in the microcomputer market

But, the Dragon 32 is available It is possible to buy the Dragon 32 off the shelf in many high-street stores There are no four-month waiting lists

Quality control on the Spectrum also leaves something to be desired While it is impossible to gather comprehensive figures, an alarming number of Spectrums are being returned — either because they did not work when they were delivered or because they crashed within hours or days of being switched on

With the launch of the ZX81 Clive Sinclair became the undisputed leader in the micro field That lead is now being challenged

There is still time for Sinclair to come back But he needs to solve his production problems and quickly

Sinclair has already lost an immense amount of goodwill He cannot afford to lose much more

Next Thursday

Are you a radio ham? Log your calls with DSO — a radio directory program for the 16K ZX81 by Anthony Briggs

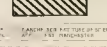
Also next week, a review of some of the latest Commodore software for the Vic20 Mike Grace takes a look at Mastermind, Quizmaster and English Language Revision



FAST M/CODE
ARCADE ACTION
WINGED AVENGER



MICROFEST '82





LEAs favour Acorns and Research Machines

THERE are several reasons why the Sinclair Spectrum is not being selected for the Department of Industry's education scheme.

The Micros in Primaries programme is an extension of the earlier secondary schools scheme — in which a Sinclair machine was not included.

LEAs taking part in the earlier scheme will have standardised their secondary schools on either the Research Machines or Acorn BBC computers — and most of these have opted for the same machine in their primaries.

The Inner London Education Authority has selected the RM480Z under both grants offers. Derek Esterson of its computer department said: "We feel that standardisation is absolutely essential to enable us to provide any kind of sensible support for the schools."

Both Hampshire and Manchester LEAs have chosen the BBC machine for primaries and secondaries. A spokeswoman for Manchester LEA commented: "The need for standardisation is obvious if you look at software. What we buy must be compatible with as many machines as possible."

Whilst the ZX Spectrum at £175 appears to have a substantial price advantage over its nearest rival — the BBC at £399 — this is not entirely relevant in the DoI scheme. By the time you add on the price of a colour monitor to the package the proportional saving is reduced. The Spectrum then becomes £472 compared with the £650 of the BBC. Nigel Searle — Sinclair's Computer Division head — admits that this narrowing of the gap is one of the reasons for their recent £15m schools discount offer. Because the DoI offer is applicable to only one machine per school, the price advantage offered by the Spectrum becomes a less important consideration.

The much publicised production and delivery problems have not helped.

Derek Esterson reckons that "the Spectrum is just not up to the battering it will get in schools."

East Sussex Authority, which made the decision to standardise on Commodore Pets as long ago as 1978, has still to decide on the machine for its primary schools. Gordon Holmes, its equipment buyer, has not been able to evaluate either the Sinclair or Research Machines options. Griffin and George Ltd, appointed to distribute the Sinclair machines in schools, has no Spectrums to demonstrate.

Hampshire is firmly recommending the use of the BBC machine to its schools. In a letter from Mr Bothwell of its County Education office it advises against adoption of the Sinclair Spectrum: "It is disappointing that several computer specialists who have recently evaluated the machine are less than enthusiastic about its performance and handling properties." The document is critical of the multi function keyboard, picture quality, screen mapping system and 'idiosyncratic' version of Basic. The letter continues: "It is therefore with considerable reluctance that the decision has been taken not to place orders with the DoI for this machine.

'Schools are strongly urged to consider cancelling unfulfilled orders for the Sinclair Spectrum which may have been placed in anticipation of a different decision."

Spectrum deal not 'queue-jumping'

FIVE HUNDRED Spectrum microcomputers have been promised within 28 days to people who order through an Observer Newspaper special offer announced on October 17.

A Sinclair spokesman emphasised that there was no question of queue jumping. "It does seem unfair, but the deal was set up three months ago," he said. "Orders from the offer will be treated the same as any other order. By the time the Observer orders come in we will be on a 28 day delivery pattern anyway," he added.



An Observer spokesman confirmed that the first 500 orders would be dispatched within 28 days. "We have had a fantastic response to the offer, but we may run into delivery difficulties after the first 500," she said.

Sinclair Research is confident that the delivery back-log of normal mail-orders will be cleared by mid-November, and has begun to readvertise the product.

Unleashing of the Lynx

CAMPUTERS will launch its Lynx microcomputer in the second week of November. It will include 48K Ram and will cost £225 including VAT.

Three other versions of the Lynx with 96K, 128K and 192K Ram should follow in the next few months. The 96K machine will cost £295.

Tron in Town

TRON, the video game movie from Disney, opened in the UK on October 22 at the Odeon Cinema, Leicester Square. It will go on general release from December 27. The film stars Jeff Bridges, David Warner and Cindy Morgan, and is directed by Stephen Lisberger.



[illegible]

Three new micros from Sanyo

SANYO will launch three new microcomputers in the UK in January 1983.

Called the PHC-10, PHC-20 and PHC-25, they are aimed at the home user and range in price from £60 to £150.

With 16K Ram, high resolution graphics, three voices and nine colours the Z80A based PHC-25 is the most advanced. It will be priced at £150. It runs a version of Microsoft Basic similar to that of the Dragon. There are four graphics modes: text only, monochrome 64 x 64 nine colours, 192 x 128 nine colours and 256 x 192 three colours. Cursor keys are separate and four user definable keys are provided. The PHC-25 is fitted with a Centronics port, cassette output and both tv and monitor outputs.

The PHC-20, to cost around £100, has 4K Ram and is monochrome only. The PHC-10, planned for £60, is better powered, has 4K Ram, 16-character LCD display. It has no tv output and runs in integer only Basic.

Oric: set back but enhanced

LAUNCH of the Oric 1 16K and 48K microcomputers has been put back one month. Production problems have meant that the first 1,000 machines are now planned for release in mid December.

The 48K version, still at £169, will now be bi-lingual. Forth will be offered on the machine — provided as a free cassette with every unit.

Also planned are an Extended Basic — providing a structured programming capability — scheduled for release at under £40 early in the New Year, and a version of Pascal.


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Letters

write to Letters, Popular Computing Weekly, Hobhouse Court, 19 Whitcomb Street, London WC2

An inspired exhortation

I have been prompted to write to you after having read a letter from Stephen Kelly, *Popular Computing Weekly* September 2 As he quite correctly states, the *Screen$* function returns a null string for the graphic characters and the user defined set, although I would not go so far as to say that this function/symbols are pointless in games

However, there is a way of using user defined characters and having the *Screen$* function return the code This involves changing the character set pointer to an address in Ram The following routine will change Ram top, copy the character set to Ram and then alter the pointer

```
1 LET B = 15616
2 CLEAR 31831
3 FOR A = 31832 TO 32599
4 POKE A, PEEK B
5 LET B = B + 1
6 NEXT A
7 POKE 23606 88
8 POKE 23607 123
9 STOP
```

This having been done, it will now give you an extra 96 user defined characters, starting from code 32 (space) to code 127 (copyright symbol) plus the normal 21 user defined graphics There are now a total of 117 characters that can be redefined

It is important to note, however, that you cannot define the characters by *Poke Usr* 'A' etc The start address of a given character has to be worked out beforehand This is done by address + (character *Code* * 8) The resulting address followed by the next 7 have to be *Poked* in the normal way To *Save* the character set on tape, just enter *Save* "name" *Code* 31832 768

D Hayward
4 Lane End
Whelford
Nr Fairford
Gloucester GL7 4HF

Infinite improbability

Have you noticed that although Sinclair Research is based in Cambridge, orders have to be sent to Camberley for a computer assembled in Dundee?

The computer then arrives from Aldershot, made from components bought from Japan, Portugal Ireland America and France Has the infinite improbability of receiving a ZX Spectrum caused Sinclair Research to be everywhere in the universe at the same time?

Bill Longley
388 Ipswich Road
Colchester
Essex

My Guardian Angel lives

The great thing about the ZX Spectrum is that it doesn't suffer from the dreaded Ram-pack wobble of its predecessor does it? I mean, programs won't just vanish in front of your very eyes, will they?

So there I was, two hours into typing my first program into my shiny new Spectrum (which sounds as though a wasps' nest has inadvertently been trapped inside it) when I noticed strange blue blobs spattering themselves rapidly over the screen

Do something safe' I thought, but before I could do anything — aaarrrgh'!! It 'newed' All by itself Sinclair's done it again!!

Ah well — I'll send it back and with a bit of luck I won't see the thing again this year

P Gleave
39 Clanson Ave
Northolt
Middx

A star over Bethlehem

I regularly read your brilliant magazine I am a proud owner of a 3.5K Vic20 and the first headline in *Popular Computing Weekly*, October 7, that caught my eye was Vic20 adventure games tested

Eagerly I flicked to page 12 as I've never bought an adventure The review was well written and I was prepared to go out and buy the first adventure I could find but not if they were too expensive for me

How much is a cartridge? By Christmas will the prices be lowered because of rival competition from companies such as Sinclair? Do they need memory expansion and which one would you recommend for the beginner? Meanwhile, keep up the high standards in your magazine

Paul Grove (13)
2a Grove Wood Hill
Coulsdon
Surrey

Each of the adventure games costs a lot at £24.95 and is available from Commodore, Commodore dealers or through the Vicsoft mail-order magazine Commodore claims that there is little chance of the price coming down to a more reasonable level before Christmas.

Breaking the Mobius strip

In Volume 1 No 23 the Cover story program Tunnel does not run properly The m/c breaks into the variables area Two changes to the program will stop this

```
1) POKE 16872 79
2) Line 115 should read
LET A = A + (A<D) − (A>18 AND W = 2) − (A>18 AND W = 1)
```

I hope that this will be of some help

M Snowdon
109 Kimberley Road
Solihull
West Midlands

Can I claim top score?

After programming Scramble into my Vic20 computer I was interested to read that the highest score was 820 Now after a week of practice at the game I have achieved a score of 900 Has anyone done any better?

Stewart Douglas
11 George Street
Sherburn
Durham

Give us the explanation

I typed in the excellent Spectrum Disassembler from the September 23 issue of your magazine It works very well except when it comes across certain Z80 instructions

As you can see from the copy I made of the screen it does not correctly disassemble address 69 It does this whenever it encounters a code value of 253 or 221 These codes have something to do with the prefixing of instructions using the IY and YX registers

I have checked my listing and can find nothing wrong with it Would it be possible for you to perhaps print something in your magazine confirming (or not) that your listing is correct, so that I will then know where the problem lies

```
46 RST 56
47 RST 58
48 PUSH BC
49 LD HL, (23649)
52 PUSH HL
53 JP 5798
56 PUSH AF
57 PUSH HL
58 LD HL, (23672)
61 INC HL
62 LD (23672) HL
65 LD A,H
66 OR L
67 JR NZ 72
69 ? 253 CLEAR
   58 4
71 LD B R 84 @
72 PUSH BC 187 OR
73 PUSH DE
```

Keith Robertson
Gilfach
4 Digney Close
Holyhead
Anglesey
Gwynedd
LL65 2PW

We think the listing was correct. Does anyone else have an explanation?

And little bugs have littler bugs

The following bug is present in all ZX81s The bug is that the Spectrum and the ZX81 both think that ½ is unequal to .5 (.5 is however equal to ½)

The fault (in the '81) is that the binary value of .5 is one bit short, so it's not surprising that a comparison with ½ (which it calculates correctly) will fail

The following line of Basic will illustrate the fault on both machines

```
IF ½ <> .5 THEN PRINT "OOPS"
```

G M Margetson
3 Bransdale Close
Baildon
Shipley
W Yorks
BD17 5DQ

If you have an opinion you want to express, or have spotted an error that needs correcting, write to Letters, Popular Computing Weekly, Hobhouse Court, 19 Whitcomb Street, London WC2



COVER STORY

Guy Fawkes

A new game for 16K Spectrum
by Matthew Bramble

The 5th of November is Guy Fawkes night in Britain each year an occasion for celebration with fireworks, children begging a penny for the guy and the burning of effigies of Guy Fawkes

Guy Fawkes was an early seventeenth century English soldier, exiled in the Spanish army He was brought back to Britain by the organisers of the Gunpowder plot for their attempt to blow up the Houses of Parliament and King James I, on November 5 1605

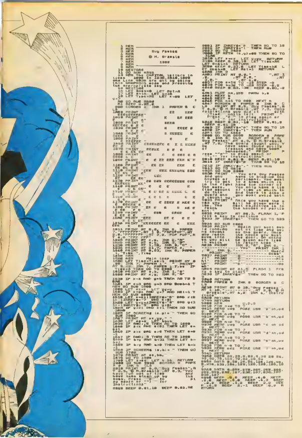
The conspirators were all Roman Catholics and the assassination attempt was directed as a protest against the increasing repression of Catholics under James I

One of the conspirators leaked the details of the plot. The barrels of gunpowder, hidden in the cellars under the Houses of Parliament were discovered on November 4 Guy Fawkes was tortured and then executed near Parliament in 1606

In this program by Matthew Bramble, for the 16K Spectrum you can re-play the last days of the conspiracy The object of the game is to travel across a maze and collect a barrel of gunpowder It is a race against time and the guard chasing you

Once you have collected the gunpowder you have to carry it back across the maze deposit the gunpowder inside the Houses of Parliament and then race back through the maze to your safe house before you run out of time are caught by the guard or Parliament blows up

Your score displayed as the time you have left, is shown throughout the game Full instructions on which keys to use to work your way through the maze are given in the program



```
   1 REM ------------------------------
   2 REM
   3 REM        Guy Fawkes
   4 REM
   5 REM       © M. Bramble
   6 REM
   7 REM          1982
   8 REM
   9 REM ------------------------------
  10 RESTORE
  11 GO SUB 4000
  13 REM The CAPITAL letters in lines 1000 to 1030,1510,1800 and Line 5030 are got by going into GRAPHICS mode and pressing the appropriate key
```

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Play up, play up and play the game

***David Kelly** talks to Graeme Levin of the Games Centre*

Through the small door at the back of the Games Centre shop in London's Oxford Street and up four floors. Past piles of games of every conceivable size and type crowding out into heaps on the landings. And up to the small, paper festooned office on the top floor, from where Graeme Levin runs his chain of games shops.

He is a likeable, slightly nervous individual. Any conversation with him is certain to be punctuated by a succession of enforced halts while he sorts out some problem or other on his constantly ringing phone.

At the moment he is preoccupied with the final arrangements for the opening of his seventh shop — in Birmingham.

Graeme first came to this country from South Africa eleven years ago. He began 'what he describes as a 'publishing venture' out of which was born the idea of a shop that would specialise in selling games. He has been an avid games player and inventor for many years — he co-invented the game Speculate. More recently he has been instrumental in bringing some games — such as Survive and Conspiracy — on to the market.

The first Games Centre opened in 1974 at a little shop in Hanway Street, tucked away behind Oxford Street and Tottenham Court Road. Four years later a second shop was added in Charing Cross Road and the Hanway Street business was moved to new prestige premises in Oxford Street.

In the last twelve months four more shops have opened with two more including the Birmingham store, to open shortly. Graeme says: "We spent some time getting the formula for the shops right. Now is the right time to expand because we are seeing a greatly increased demand for our goods — not just for our video games and computers, but for our whole range of games, puzzles, books and toys.

We now stock over 15 000 lines and included in those is what is certainly the world's largest selection of games. The highest turn-over of any group of products is shown by the video games and computers. Within this group the Atari software cartridges sell best.

"We can offer what none of the normal high-street retail chains can — expert advice. If I was going to spend two or three hundred pounds on a machine I'd want to be given proper help to choose the right system for me. The Games Centre may not be the cheapest place to buy a microcomputer but it prides itself on being able to help customers to make that right choice. And it continues to offer good after sales advice and assistance.

At the moment the Games Centres sell the Atari range of products, the ZX81, Mattel Intelevision and the Dragon 32. Future plans include the Sinclair Spectrum as soon as it goes retail — possibly by January — and the Commodore 64 — hopefully in November.

"By this time next year we intend to have the largest range of software available in a shop for these machines," says Graeme. "It is a big ambition — we are still learning — but we are going to try very hard to achieve it.

"Software is very important. What we found when we started to sell the Atari system was that hardware sales were slow until we established a good spread of software. After that both the software and hardware sales took off.

"So when we took on the ZX81 we bought small quantities of every cassette we could find to try out. From that we were quickly able to build up a comprehensive collection of the good ZX81 software. The same sort of approach will be adapted for both the ZX Spectrum and the Commodore 64.

"There are now so many microcomputers either here or about to be here that it is not easy to decide which will sell and which will not. The future of home computers is intimately connected with those of games and leisure, but I would make a distinction between games and hobbyist computers.

"The Mattel Intelevision and Atari are games machines first and foremost. The Dragon-32 and Commodore-64 are primarily hobbyist machines — they are games machines second. It was a difficult decision for us to stock these two latter, but we feel sure that they will do well. They are both such interesting machines that the games software is bound to be developed for them."



Reviews

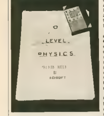
Chalking up the A grades

***Tony Bridge** looks at the latest educational software for the ZX81*

THE SCENE a crowded first-grade class room Each pupil has a microcomputer on the desk in front of him with a monitor

COMPUTER 'Good morning children
PUPILS (in chorus) Good morning ZX95
COMPUTER After the register we will begin the day with arithmetic
PUPILS (in chorus) Groaaan

Fanciful? Well yes, but one pole of opinion holds that computers will eventually supplant if not teachers at least all textbooks



and pen and paper in the classroom

The opposite pole of course believes that computers should be kept out of the classroom completely and taught as a subject like any other on the curriculum

The truth no doubt lies somewhere between the two After all radio tv, and the VCR have all been assimilated painlessly into the classroom But it is a fact that there are a great number of misconceptions about the subject

Software for education is at the sharp end of what must be a well judged exercise in easing the fears of many parents and teachers

The Sinclair ZX81 is not the ideal computer for school use it is cheap yes, but the keyboard together with the easily jogged Ram pack and mains lead and the slow access time are all major drawbacks to acceptance However many schools already have the computer and there is a multitude of software available for education purposes

Let s start this review with Sinclair's own contribution to the field ICL has produced a series called *Fun to-Learn* for Sinclair Research The series includes titles such as Music, History Geography and Inventions The whole package was reviewed in these columns in issue No 10

At £6 95 the tapes are over-priced and in their present format really only of use as General Knowledge quizzes on long winter evenings with the family Many of the questions contained within the programs are interesting but unfortunately there is no supporting documentation Sinclair must be serious about its involvement in education and a modest investment in well-planned textbooks to go with each tape must be high on its list of future releases

Of the two programs received from Rose Cassettes one is for the under eights and the other for GCE O-level students *Arithmetic* for the under-eights tests the pupil in addition subtraction division and multiplication Extra large characters are used in the sums which would be of great use in the classroom

As a correct answer is input a feature is added to the face on a balloon When the face is complete the balloon rises into the sky A very good program this which makes a sometimes unpopular subject more interesting and amusing to the younger pupil

The *French* tape is aimed at 13-16-year-old students of the language Side one tests on grammar with side two setting questions on vocabulary The pupil is given a word or phrase in either French or English, and asked to translate A good, solid program

Rose Cassettes have released a number of educational programs and if they are all of such a high standard as the two represented here they can be safely recommended A lack of supporting literature again however reduces Rose Cassettes' potential

Philip and Joy Lawton as AZEP (Computer Training Consultants) have released a number of tapes at a very reasonable £1 95 per topic The topics for A-level students and undergraduates include such simulations as *Motor Bike* — acceleration speed distance, *Resistor* — inductor circuit transients and 10 other equally exotic titles Study booklets for each topic are a further £1 95, and VHS videocassettes are also available for just £19 95



THIS IS WHAT YOU ARE HEADING FOR

The tape submitted by AZEP was *Electronic Chalk and Talk* an awkwardly named demonstration of the ZX81 s use in CAL (Computer Assisted Learning) The program is impressive in use but the documentation supplied is very confused and completely unenlightening However purchasers of the other tapes may rest assured that the booklets are very well written and useful

Tasman Software of Leeds has a couple of educational programs in its small catalogue (in fact they represent two-thirds of Tasman s output) *Tasmeq* helps acquaint students with simultaneous equations Good but restrained use of graphics (no races or games) and good progressive teaching make this an ex

tremely useful program If the correct answer is given a harder problem is set while an incorrect answer prompts another problem of equal difficulty Thus the student is helped along at the correct pace for his ability The examples are all worked through step by step and makes learning very much easier

Tas-ing as you may deduce from the title teaches basic trigonometry using sines cosines and tangents A calculator is necessary whilst using the program but again, the good use of graphics and a scoring system make the tape very useful

Let us hope that Tasman release more educational software in the future — they are very good at it

Finally let us look at software from Sci Soft of Nottinghamshire This company has an extensive catalogue of exclusively educational programs Titles include *Maths 'O Level Biology Physics*, and *Chemistry 'O Levels* and also programs for younger students including *Jungle Maths* and *Magic Spell*

The tapes for the younger pupil rely, naturally, rather heavily on graphics but are none the worse for that **KJ,** in this column in *PCW* No 7, was not taken generally with *Jungle Maths* finding the graphics good but the coding wanting *Magic Spell* however works rather well The teacher types in ten words and speaks the same words on to tape The pupil then listens to the tape and attempts to spell the word he or she is hearing

Scores are given to each pupil (more than one may take part in each round) and then the words misspelt are conjured out of a shiny top hat on to a Magic Board The younger children loved this program The same result could probably be obtained by using ordinary pencil and paper but the program is great fun and could be given a place in a busy classroom

The *Teachers Markbook* is an electronic aid for the busy teacher Pupils marks are input and rank-ordered for future examination As Sci-Soft says, this program would prove extremely useful at a parent s evening as a novel way of showing parents how their child is progressing For day-to day use, however the teacher could probably do just as well with pencil and paper

The main bulk of Sci Soft s release however is aimed at older students about to take their GCE O Levels in one of several subjects The *Revision* tapes are all pretty similar containing seven or eight long programs The first one in each case is *Revision*, which guides the student through the last few weeks leading up to the exam

Although the program admits it won t pass the exam for you, it does give you sound advice This advice sometimes gets a little whimsical as for instance 'try praying ' The same advice could be given in the accompanying book but is no less sound coming from the TV screen

The following programs on the tapes concentrate on setting specific questions on the subject in hand Although the questions contained in the program are excellent alternative questions may be inserted Very good graphics are used and scores are also given Once the student has gained 10 points (certainly not easy) the program declares that he or she will probably pass the exam This format is adhered to throughout the *Chemistry* and *Physics* packages and we imagine the others

The most outstanding feature of these excellent packages however is the supporting literature which consists in each case of some 50 pages of densely-packed revision material such as diagrams formulae and so on This literature really lifts this series of software head and shoulders above the rest and should serve as an example to other aspiring educationalists

Summary

Most of these programs would work rather better in the home than the classroom Rose Cassettes' *Arithmetic for the Under-Eights* with its chunky graphics, might be an asset in the busy classroom but tapes like the ICL collection or Sci-Soft s Revision packages are obviously of more use in the home

Few of the programs auto-ran and in none of them was the *Break* key disabled making them difficult to use in unsupervised conditions More seriously however most of the packages lacked any kind of supporting literature At the risk of labouring this point we must stress that well written textbooks such as Sci Soft s are a necessity

After all a child s education is a sensitive matter and should be approached responsibly To this end we were glad to see that most of the programs were written by or with the help of qualified teachers

So despite many faults all the programs reviewed in one way or another accomplished their professed aim to educate

HELLO THERE DAVID

SO YOU THINK THIS WILL PASS YOUR
"O"LEVEL FOR YOU?

WELL SORRY ,BUT IT WONT
WHAT IT WILL DO IS SHOW YOU WHAT
YOU CAN DO TO HELP YOURSELF

HOWEVER

THE MOST IMPORTANT LESSON IS
THAT THERE IS NO SUBSTITUTE
FOR HARD WORK

(REMEMBER C TO COPY OTHERWISE
PRESS ANY KEY)

2 3 3
+2 1 5
7 8
0

NO NO, TRY AGAIN
LAPLACE

Open Forum

Open Forum is for you to publish your programs and ideas
It is important that your programs are bug free before you send them in We cannot test all of them
Contributions should be sent to Popular Computing Weekly, *Hobhouse Court,*
19 Whitcomb Street, London WC2H 7HF

How to contribute

Each week the editor goes through all the programs that you send to Open Forum in order to find the Program of the Week

The author of that program will qualify for DOUBLE the usual fee we pay for published programs
(The usual fee is £5)

Presentation hints

Programs which are most likely to be considered for the Program of the Week will be computer printed and accompanied by a cassette

The program will be well documented, the documentation being typed with a double spacing between each line

The documentation should start with a general description of the program and then give some detail of how the program has been constructed and of its special features.

Listings taken from a ZX Printer should be cut into convenient lengths and carefully stuck down on to white paper, avoiding any creasing

Please enclose a stamped, self-addressed envelope

Memory Game

on ZX81

Here is a program that takes only a couple of minutes to type in yet can supply hours of frustratingly enjoyable moments It is an ideal game for those who do not yet know their way round the ZX81 as no graphics are used

A letter appears in the top left hand corner and is displayed for about two seconds then the screen goes blank You now have to type in the letter you saw Note there is no time limit If you get it right another letter will be added to the first and again you type in the letters and so on If you should get any of the letters wrong the number of letters you reached is displayed

If at the end you wish to see the correct answer then add this line

```
110 PRINT "IT WAS ";A$
```

If you think the time allowed is too long or short then you can change line 60 to a suitable number If you still find it too easy try changing line 20 to

```
20 LET B= INT (RND * 36) + 28
```

then you get numbers as well!

If you wish to keep the highest score on the game then add the following

```
5 INPUT H
95 IF LEN A$ > H THEN LET H = LEN A$
105 PRINT "HIGHEST SCORE = ";H
115 INPUT Z$
120 CLS
125 GOTO 10
```

When first run enter 0 as highest score Enter highest score all other times Highest score held by me is 14 using letters only

```
10 LET A$=""
20 LET B=INT(RND*26)+38
30 LET B$=CHR$ B
40 LET A$=A$+B$
50 PRINT A$
60 PAUSE 100
70 CLS
80 INPUT C$
90 IF C$=A$ THEN GOTO 20
100 PRINT "SCORE=";LEN A$
```

Memory Game
by Ian McGrath

Ramtop/Atomic Noe

on ZX81

This program is for a 16K ZX81 with a printer attached It has two interesting features, the first being that it uses some custom designed characters on the printer by means of a modified *Copy* routine from the *Rom* and an alternative character set placed above *Ramtop*

The second feature is that although space above *Ramtop* is required by the program it will reserve this space for itself by resetting *Ramtop* without clearing *Ram* The routine that does this is contained in Line 8095 It does not used *Usr* 1040 because it doesn t work.

The routine will reset *Ramtop* and reconfigure Basic to the address *Poked* into the bytes at 16507 and 16508 Since this involves moving the Z80 machine stack and Basic s *Return* stack for *Gosubs* anything that might alter these stacks during the move would cause a crash and so *Ints* and *Nmis* must be prevented by running the routine in *Fast* mode

The program itself computes and draws an electronic configuration diagram of an atom on being given an Atomic Number between 1 and 112 Such a diagram shows the levels sub-levels, and orbitals in which the electrons are arranged in an atom

The diagram will appear on the printer as a series of boxes arranged in rows with a label for each row The first number in the label is the level number, the letter is the type of orbital arrangement followed by the number of electrons in that sub-level The higher the level the more room there is for orbitals and therefore the more sub-shells in the level

Each sub-shell has a particular arrangement of orbitals (S P D F) containing 1 3 5 and 7 orbitals respectively and each orbital can hold up to two electrons Since electrons have spin and this spin is important the electrons are represented in the diagram as up-arrows and down arrows in a convention found in most textbooks on the subject

Since Sinclair characters do not support the characters needed for the program and since only software techniques are portable the ZX Printer is used as the main output device as custom characters can be produced on it using only programming techniques This works by duplicating the *Rom Copy* routine in *Ram* and altering one byte to make it use the address 32256 as the base address for the character-generator instead of the normal 7680

The *Rom* C-Gen is copied above *Ramtop* and 32 bytes are altered redrawing four Graphics characters (1 to 4) The diagram is drawn on the screen first and then *Copyed* to the printer by Line 8001

If you haven t a printer then alter S$ to "space-/inverse- less than/inverse-greater than T$ to space-/inverse less-than/inverse space I$ to space/inverse space/inverse space You won t need Line 305 8000 to 8130

Format 1 is the diagram, format 2 is simply a list of the labels

The first step in entering the program is to enter program one to compile the

machine code *Rems* and the character-generator. On *Running*, the program will ask you to enter the contents of table one after it has finished doing the *Copy* routine and when this is done it will run the *Ramtop* routine to reset *Ramtop* and then transfer the *Rom* character-generator to the newly protected area.

It will then ask you to enter table two to alter some of the characters. That done it will stop, requesting you to delete the program except for the *Rems* and to alter the line numbers as indicated. Then enter the main program.

When all is done the first thing is to *Goto* 8040. This will read the char-generator into Q( ) to be *Saved* with the program so that on being *Loaded* the program will *Run* automatically resetting *Ramtop* and building the char generator from Q( ).

Program notes

Lines	
26-40	N ( ) is the level number. L ( ) is the sub-shell type
50-55	E ( ) is the full electron number. S$ is a full orbital. T$ is a half empty orbital and I$ an empty orbital. The graphic characters are altered for the printer, and no Sinclair characters will give a sensible screen display anyway
385	*Gosub 8000* is the routine that *Copys*, the screen to the printer
470-500	Subtract a full sub-shell's worth of electrons from the Atomic number till the remainder R is zero or less. As long as R is positive a full row of orbitals containing two electrons each may be printed. C is the number of electrons, and if R is less than zero not all the orbitals will be full and C is reduced accordingly
606	Prints the sub shell label
610	B is the number of orbitals (boxes) in the current sub-shell. T is the number of full orbitals 1 one or more. If T = B then all the orbitals are full. If T is negative some orbitals must be empty
650	B − Abs T gives the number of half-empty orbitals
675	T now gives the number of empty orbitals
788 790	Formats the level list and prints it
8040-8080	Store the character generator (above *Ramtop*) in Q ( ) to *Save* it on tape with the program
8091 8092	16507 and 16508 are where the *Ramtop* routine expects to find the new value for *Ramtop*
8094	Adds five to the value of *Nextlin* system variable to get the start of machine code routine in the next line of Basic (*Ramtop* routine)
8100	Transfer the character generator to above *Ramtop*

MAIN PROGRAM

```
   1 REM 1.S.2.S.2.P.3.S.3
.3.P.6.4.S.3.D.10.4.P.6.5.
4.D.10.5.P.6.6.S.5.2.4.F.14.5.D.10
.6.P.6.7.S.2.6.F.14.6.D.10
   8 FAST
  15 REM LINE 10 IS EQUIVALENT T
O  DATA  STATEMENT
  20 DIM N(20)
  30 DIM L$(20)
  40 DIM E(60)
  50 LET S$="
  55 LET T$="
  56 LET I$="
  60 LET PC=16514
  65 GOTO 100
  70 FOR V=1 TO 19
  75 REM GOSUB 9000 IS EQUIVALEN
T TO  READ  AND READS FROM LINE
105 REM(DATA) STATEMENT
  80 GOSUB 9000
  90 LET N(V)=VAL D$
 100 GOSUB 9000
 110 LET L$(V)=CHR$ CODE D$
 120 GOSUB 9000
 130 LET E(V)=VAL D$
 140 NEXT V
 145 GOTO 300
 150 CLS
 155 PRINT
 160 PRINT "   THIS PROGRAM WILL
CALCULATE
 170 PRINT  THE NUMBER OF ELECTR
ONS IN EACH
 180 PRINT  ENERGY LEVEL OF AN A
TOM, GIVEN"
 190 PRINT  "THE ATOMIC NUMBER."
 191 PRINT  "  THE PROGRAM OBEYS
  HUNDT.S   RULE   IN FILLING O
RBITALS, I.E. IT PUTS ONE ELECTR
ON IN EACH    ORBITAL UNTIL LACK
  OF EMPTY    ORBITALS CAUSES EL
ECTRONS TO    DOUBLE UP
 200 PRINT  THE RESULT CAN BE DI
SPLAYED IN
 210 PRINT  ONE OF TWO FORMATS
 220 PRINT
 230 PRINT     1. ENERGY LEVEL DI
AGRAM
 240 PRINT     2. ELECTRONIC CONF
IGURATION
 250 PRINT
 270 PRINT "THE PRINTER SHOWS TH
E BETTER OUTPUT."
 275 GOTO 70
 300 SCROLL
 305 GOSUB 8000
 310 PRINT "ENTER AN ATOMIC NUMB
ER (1-112)"
 320 INPUT A
 330 IF A<1 OR A>112 THEN GOTO 3
00
 340 SCROLL
 350 PRINT  FORMAT ? (1 OR 2) .
 360 INPUT F
 370 IF F<1 OR F>2 THEN GOTO 340
 380 LET A=INT A
 390 LET F=INT F
 400 LET V=1
 410 LET I=5
 420 LET M=0
 430 LET J=21
 440 LET U=0
 442 LET B=2
 444 LET Y=0
 450 CLS
 455 PRINT
 455 PRINT
 460 PRINT "ATOMIC NO.= ",A
 470 LET X=E(V)
 480 LET R=A-X
 490 LET B=R<=0
 500 LET C=X+B*R
 510 GOSUB F*100+500
 520 LET A=R
 530 LET V=V+1
 560 IF B=0 THEN GOTO 470
 580 PRINT AT 21,0,
 585 GOTO 300
 570 GOTO 470
 600 IF C=0 THEN RETURN
 605 PRINT AT 21-V,1,N(V),L$(V),
E(U)+B*R,AT 21-V,16-3*X/4;
 610 LET B=E(V)/2
 615 LET N=C
 620 LET T=N-B
 625 IF T<1 THEN GOTO 648
 630 FOR M=1 TO T
 635 PRINT S$,
 640 NEXT M
 645 IF T=B THEN RETURN
 650 FOR M=1 TO B-ABS T
 655 PRINT T$,
 660 NEXT M
 670 IF T>=0 THEN GOTO 699
 675 LET T=ABS T
 680 FOR M=1 TO T
 685 PRINT I$,
 690 NEXT M
 699 RETURN
 700 IF C<=0 THEN RETURN
 705 PRINT AT Z,M;
 710 IF U<=6 OR B=1 THEN GOTO 75
0
 720 LET Z=7
 725 LET M=0
 730 PRINT AT Z,M,
 740 LET B=1
 750 IF U<=16 OR U=1 THEN GOTO 7
80
 760 LET Z=9
 765 LET M=0
 770 PRINT AT Z,M,
 780 LET U=1
 790 IF U<=19 OR Y=1 THEN GOTO 7
95
 791 LET Z=11
 792 LET M=0
 793 PRINT AT Z,M,
 794 LET Y=1
 795 PRINT     ,N(V);L$(V),E(U)+B
*R,
 798 LET M=M+6
 799 RETURN
8000 RAND USR (PEEK 16425+256*PE
EK 16426+5)
8001 REM   E£RND7?   SURNDLN SCR
OLL "VAL FAST  ?PEEK CLS LPRINT
LN ??E  PEEK CLS INT E:= CLS , I
F THEN  K INPUT FAST STR$ 7 RETU
RN      ???? RETURN
8275 E, ATCS    ?ACS )    ?ACS
"37:= CLS SK CLS ?PEEK CLS : LET
  LPRINT /STR$ := CLS 3K CLS ??PE
EK CLS SGN ?ACS 7C  T +4 Y, PEEK
CLS LN   AT S7RNDS
1560   ( CLS 7ACS COPY NBRNDTAN
8009 REM THIS ROUTINE (8001) IS
A MODIFIED          FROM ROM, AND
USES CHARACTER MATRICES PLACED A
BOVE          .
8010 RETURN
8040 CLEAR
8050 DIM Q(512)
8060 FOR A=1 TO 512
8070 LET Q(A)=PEEK (A+32255)
8080 NEXT A
8085 PRINT "PRESS            WHEN
RECORDER IS RUNNING"
8086 INPUT A$
8087 CLS
8088 SAVE  "E-LEVEL"
8091 POKE 16507,0
8092 POKE 16508,128
8093 FAST
8094 RAND USR (PEEK 16425+256*PE
EK 16426+5)
8095 REM E RND  GOSUB ??? GOSUB
??RND  AND CLEAR ?  CLEAR ? P G
OSUB  E RND  GOSUB ??? FOR RAND
  GOSUB ? CLEAR ?  CLEAR ? TAN
8099 REM THIS ROUTINE (8095) RES
ETS          AND ALTERS
 USE OF MEMORY TO MATCH, WITHOUT
 CLEARING RAM IN ANY WAY.
8100 FOR A=1 TO 512
8110 POKE A+32255,Q(A)
8120 NEXT A
8130 RUN
9000 LET D$=""
9010 LET D$=D$+CHR$ (PEEK PC)
9020 LET PC=PC+1
9030 IF PEEK PC<>27 AND PEEK PC<
>118 THEN GOTO 9010
9040 IF PEEK PC=27 THEN LET PC=P
C+1
9050 IF PEEK PC=118 THEN LET PC=
PC+6
9070 RETURN
```

PROGRAM OF THE WEEK

```
   THIS PROGRAM WILL CALCULATE
THE NUMBER OF ELECTRONS IN EACH
ENERGY LEVEL OF AN ATOM  GIVEN
THE ATOMIC NUMBER.
   THE PROGRAM OBEYS  HUNDT.S
RULE   IN FILLING ORBITALS, I.E.
IT PUTS ONE ELECTRON IN EACH
ORBITAL UNTIL LACK OF EMPTY
ORBITALS CAUSES ELECTRONS TO
DOUBLE UP.
THE RESULT CAN BE DISPLAYED IN
ONE OF TWO FORMATS

   1. ENERGY LEVEL DIAGRAM
   2. ELECTRONIC CONFIGURATION

THE PRINTER SHOWS THE BETTER OUT
PUT.

ATOMIC NO.= 112
 8D10
 5F14
 7P6
 6P6
 5D10
 4F14
 6S2
 5P6
 4D10
 5S2
 4P6
 3D10
 4S2
 3P6
 3S2
 2P6
 2S2
 1S2

ATOMIC NO.= 21
 3D1
 4S2
 3P6
 3S2
 2P6
 2S2
 1S2

ATOMIC NO.= 21

 1S2  2S2  2P6  3S2  3P6  4S2
 3D1
```

```
   1 REM PPPPPPPPPPPPPPPPPPPPPPPPP
PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP
PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP
PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP
PPPPPPPPPPPPPPPPPPPPPPP
   2 REM PPPPPPPPPPPPPPPPPPPPPPPPP
PPPPPPPPPPPPPPPPPPPPPPPPPPPPP
   5 FAST
  10 FOR A=0 TO 133
  20 POKE A+16514,PEEK (A+8153)
  30 NEXT A
  40 POKE 16576,83
  50 PRINT "ENTER FROM TABLE ONE"
  60 FOR A=0 TO 81
  70 PRINT AT 10,0,A "  "
  80 INPUT B
  90 PRINT B
 100 POKE A+16680,B
 110 NEXT A
 120 POKE 16507,0
 130 POKE 16508,128
 140 RAND USR 16680
 150 FOR A=0 TO 511
 160 POKE A+32256,PEEK (A+7680)
 170 NEXT A
 180 CLS
 190 PRINT " NOW ENTER FROM TABLE
TWO
 200 FOR A=0 TO 31
 210 PRINT AT 10,0 A,  "  "
 220 INPUT B
 230 PRINT B
 240 POKE A+32064,B
 250 NEXT A
 260 PRINT ,, NOW DELETE THE PRO
GRAM EXCEPT  FOR THE REMS, THEN
 ALTER LINE 1 LINENUMBER TO 8001
 AND LINE 2 TO 8095.

LINE 1 REM CONTAINS 140 "P"S.
LINE 2 REM CONTAINS 58 "P"S.
```

TABLE ONE (RAMTOP ROUTINE)

205	35	15	42	4	64	170	237
114	60	77	237	91	123	64	42
4	64	253	118	6	253	114	5
27	43	237	184	19	42	9	64
175	237	114	85	77	235	249	176
237	74	253	117	2	253	116	3
209	43	18	201				

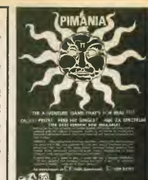
TABLE TWO (CHARACTER SET)

255	192	160	144	136	130	130	255
255	17	17	33	65	17	33	255
255	130	126	136	190	136	130	255
255	1	1	1	1	1	1	255

IF YOU HAVE NO PRINTER

```
 50 LET S$="
 55 LET T$="
 56 LET I$="
```

Ramtop
by Michael Sims



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[illegible]			
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5¼" holds 80	22 50	30 00	16 50
[illegible]			
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5¼"	4 05	3 75	3 20

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Plastic	2 85	2.55	2 15
[illegible]			
8	17 50	16 50	12 50
5¼	17 50	15 50	12 50

[illegible]	Normal price	Our price (per 10)	Axon Group discount price
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POC1

Kalaldoecope

on ZX81

This is a program for the ZX81 with at least 2K of *Ram*. The functional part of the program is written in machine code and gives a very effective kaleidoscope display. Each time the program is run a different display will be produced, and you can exit from the machine code using the break key.

Program notes

Line 1 is used as a 'safe' place to store the machine code
Lines 10-105 set up the code in the string A$
Lines 110-150 *Poke* the code into the *Rem* statement
Lines 170-220 *Print* the Screen (24 × 24 characters)
Line 170 allows a screen display of 32 × 24 characters to be used
Lines 230-240 produce a delay
Line 260 calls the machine code routine

At lines 180 and 200 the number after the word *Graphic* refers to the key on which the graphic may be found, i.e., line 200 contains the graphics on key eight followed by 23 inverse spaces.

The machine code incorporates a random number generator and uses the *Unplot* routine held in the 8K *Rom*.

```
  1 REM [illegible]
  2 REM
  5 FAST
 10 LET A$="[illegible]"
 20 LET A$=A$+"[illegible]"
 30 LET A$=A$+"[illegible]"
 40 LET A$=A$+"[illegible]"
 50 LET A$=A$+"[illegible]"
 60 LET A$=A$+"[illegible]"
 70 LET A$=A$+"[illegible]"
 80 LET A$=A$+"[illegible]"
 90 LET A$=A$+"[illegible]"
100 LET A$=A$+"[illegible]"
101 LET A$=A$+"[illegible]"
105 LET A$=A$+"[illegible]"
110 LET L=16516
120 POKE L,CODE A$*16+CODE A$(2)-476
130 LET L=L+1
140 LET A$=A$(3 TO )
150 IF A$<>"" THEN GOTO 120
170 POKE 16418,0
180 PRINT AT 23,4, GRAPHIC 8, 23*GRAPHIC 7
190 FOR F=0 TO 22
200 PRINT AT F,4,"GRAPHIC 8, 23*INVERSE SPACES
210 NEXT F
220 POKE 16418,2
225 SLOW
230 FOR F=1 TO 50
240 NEXT F
260 LET L=USR 16526
270 STOP
```

Kaleidoscope
by Ian Reynolds

Eggheed

on Vic20

This program is based entirely on the *Circle* command and written for a Vic20 with a Super Expander cartridge fitted. When the program is run the user inputs the width of the gap between each circle. Then the egg (circle) is drawn and then when it has been drawn the user hits any key to re run the program.

Program notes

Lines 10-50 input step (width) of egg
Lines 60-80 setting up screen and character colours
Lines 90-110 drawing of egg
Line 120 waiting for an input
Line 230 clear the screen
Line 140 re-run the program

```
1 REM VIC ALARM CLOCK
2 REM BY PHILIP EDWARDS
3 REM OF ALTRINCHAM
5 PRINT"(CLR)"
7 POKE36879,123
10 PRINT"(RVS ON) THIS IS ALRRM CLOCK (RVS OFF)"
20 PRINT"(1CD)(1CR)PLEASE WAIT"
21 PRINT"(7CD)(7CR┌────┐"
22 PRINT"(7CR)│ 12  │"
23 PRINT"(7CR)│  |  │"
24 PRINT"(7CR)│ 9 \ 3│"
25 PRINT"(7CR)│  6  │"
26 PRINT"(7CR)└────┘"
27 POKE56,24:POKE55,0:CS=6144
30 FORI=CSTO7678STEP2:Z=PEEK(32768+(I-CS)/2)
35 POKEI,Z:POKEI+1,Z:NEXT
40 POKE36879,25:POKE36867,(PEEK(36867))OR23
45 POKE36869,254:POKE36881,24
46 PRINT"(CLR)"
47 POKE36878,0
48 POKE36879,25
50 PRINT"(CYAN)*****(RED)ALARM CLOCK(CYAN)******
   (RED)"
60 INPUT"CORRECT TIME",TI$
70 INPUT"(CD)ALARM TIME",AL$
80 PRINT"(CLR)"
90 PRINT"(CYAN)*****(RED)ALARM CLOCK(CYAN)******
   (RED)"
100 PRINT"(6CR)(2CD)TIME IS"
105 PRINT"(6CR)",LEFT$(TI$,2),".",MID$(TI$,3,2);
    ".";RIGHT$(TI$,2)
110 PRINT"(6CR)(1CD)ALARM IS"
115 PRINT"(6CR)";LEFT$(AL$,2);":";MID$(AL$,3,2),
    ":";RIGHT$(AL$,2)
120 FORR=1TO6000:NEXTR
130 PRINT"(CLR)"
131 PRINTCHR$(158)
132 POKE36879,8
140 PRINT"(HOME)(6CD)(6CR)",LEFT$(TI$,2),":";
    MID$(TI$,3,2);":";RIGHT$(TI$,2)
150 IFAL$=TI$THEN165
160 GOTO140
165 PRINT"(HOME)(RED)(3CD)(8CR)TIME"
168 PRINT"(HOME)(6CD)(6CR)",LEFT$(TI$,2);":";
    MID$(TI$,3,2);".";RIGET$(TI$,2)
170 POKE36878,15
180 FORI=135TO239
190 FORH=1TO100:NEXTH
200 POKE36879,I
210 POKE36876,I
220 NEXTI
230 GETA$:IFA$="s"THEN46
240 GOTO165
```

Alarm Clock
by Philip Edwards

```
0 REM     EGGHEAD
1 REM(C) R.HAYNES 1982
10 INPUT "WIDTH OF GAP",W
20 IFW<501ANDW>0THEN60
30 PRINT "(W TO 500 ONLY)"
40 FORDE=1TO2000:NEXTDE
50 GOTO10
60 GRAPHIC3
70 C=1+INT(RND(1)*6)
80 COLOR0,0,C,C
90 FORX=0TO511STEPW
100 CIRCLEC,511,511,X,X
110 NEXTX
120 POKE198,0:WAIT198,1:POKE198,0
130 SCNCLR:GRAPHIC0
140 GOTO10
```

Egghead
by Robin Haynes

Alarm Clock

on Vic 20

This is an alarm clock for the unexpanded Vic20. First of all it asks you the correct time, then what time you wish the alarm to go off. Then it prints the time until it equals the alarm time and then

Lines
27 to 45 — Doubles up the characters
50 to 115 — Receives data for clock
131 to 160 — Prints Clock
170 to 240 — Makes chime

Red — control red
Clr — clear screen
Cr — cursor right
Cd — cursor down
Home — cursor home

```
10 PRINT"JINPUT START"
20 INPUTS
25 FORF=STOS+100
30 X=PEEK(F) Y=INT(X/16) Z=X-Y*16
40 IFZ>9THENZ=Z+7
50 IFY>9THENY=Y+7
60 Z=Z+48 Y=Y+48
70 PRINTCHR$(Y) CHR$(Z) " ",
80 NEXTF PRINT
90 PRINT "ANY KEY TO RESTART"
100 PRINT "OR'SPACE'TO CONTINUE"
110 GETA$ IFA$=""THEN110
120 IFA$=" "THENS=F PRINT"J" GOTO25
130 RUN
```

Blockloader
by Ian Hegerty

VicBlock Loader

on Vic 20

This program shows 100 bytes of memory (you specify the starting address at the start of the program) in hex — useful for you machine code programmers. When the block of hexadecimal has been displayed, you are given two options — restart or continue. If you restart, you respecify a new address, but if you continue, the next 100 bytes are displayed.

Program notes:
Lines 10 to 20 — *Input starting point and clear screen*
Lines 25–80 — Loop for 100 bytes
Lines 30-70 — *Peek bytes and turn into hexadecimal*
Lines 90 to 130 — wait for input and restart or continue

Astrosmash

on BBC Micro

This program, called Astrosmash, for the model A or B BBC Micro, plays a simple version of the popular arcade game Asteroids. It runs in *Mode 4*, so is only in black and white. It makes some use of the Beeb's special features, which take it one step ahead of its close competitors, eg, user definable graphics, enveloping, etc. The asteroids move up the screen in a scrolling motion.

In the game, you only have one life to play with, so quick finger on the button reactions are needed to stay alive.

When the program is run, you will be given instructions on which keys to use. The game itself runs in just over 2K.

```
10 REM **** ASTROSMASH (C) By David Potter
20 ENVELOPE1,8,1,0,0,1,0,0,127,-5,-1,-8,128,0
30 ENVELOPE 3,2,-1,0,0,50,0,0,120,-1,0,-1,120,60
40 VDU 23,225,56,124,63,31,12,6,3,1
50 VDU 23,226,28,62,252,248,48,96,192,128
60 VDU 23,227,3,15,31,63,63,127,255,255
70 VDU 23,228,224,240,240,252,252,254,255,255
80 VDU 23,229,255,255,63,127,63,31,7,7
90 VDU 23,230,255,254,254,240,248,248,224,224
100 VDU 23,231,28,126,127,255,254,127,254,60
110 A$=CHR$(227):B$=CHR$(228)
120 C$=CHR$(229):D$=CHR$(230)
130 G$=CHR$(225):H$=CHR$(226)
140 E$=CHR$(231)
150 SC=0:HI=0:MODE 4
160 CLS:VDU 4:VDU 23;8202;0;0;0;
170 PRINTTAB(11,2);"A S T R O S M A S H"
180 PRINTTAB(11,3);STRING$(19,"-")
190 PRINTTAB(4,8)"(C) By David Potter, 13 Years old"
200 PRINTTAB(4,9);STRING$(33,"-")
210 PRINTTAB(15,11)"CONTROLS:-"
220 PRINTTAB(5,13)"Left arrow key moves ship left"
230 PRINTTAB(5,15)"Right arrow key moves ship right"
240 PRINTTAB(12,17)"Spacebar to fire"
250 PRINTTAB(12,29)"ANY KEY TO PLAY"
260 U$=GET$:XS=640:YS=800:CLG
270 *FX 4,1
280 IF SC>HI HI=SC
290 VDU 5
300 PROCPOINT:PROCSCORE
310 A=INKEY(0)
320 IF A=32 PROCFIRE
330 IF XS>31 AND A=&88 XS=XS-30
340 IF XS<1208 AND A=&89 XS=XS+30
350 *FX 15,0
360 GCOL0,1:MOVE XS,YS:PRINTG$;H$
370 PROCPOINT
380 VDU 4:X=RND(36+1):Y=28
390 IF RND(1)>0.50 PRINTTAB(X,Y);E$:GOTO 410
400 PRINT TAB(X,Y);A$;B$;TAB(X,Y+1);C$;D$
410 VDU 5:MOVE XS,YS:GCOL 0,0:PRINTG$;H$
420 PROCPOINT
430 VDU 4
440 IF RND(1)>0.90 THEN 290
450 PRINTTAB(0,31);SPC(40):GOTO 290
460 DEFPROCPOINT
470 P=POINT(XS+30,YS-32):IF P=1 PROCCRASH
480 P=POINT(XS,YS):IF P=1 PROCCRASH
490 P=POINT(XS+60,YS+2):IF P=1 PROCCRASH
500 ENDPROC
510 DEFPROCFIRE
520 MOVE XS,YS:GCOL 0,1:PRINTG$;H$
530 SOUND 0,3,1,5
540 MOVE XS+15,YS-30
550 XB=XS+15:VDU 5
560 FOR YB=YS-30 TO 0 STEP-30
570 GCOL 0,1:MOVE XB,YB:PRINT "a"
580 PD=POINT(XB,YB-20):IF PD=1 PROCHIT
590 PD=POINT(XB+20,YB-20):IF PD=1 PROCHIT
600 GCOL 0,0:MOVE XB,YB:PRINT "a"
610 NEXT YB:ENDPROC
620 DEFPROCHIT
630 SOUND 0,1,4,2:VDU 5
640 GCOL 0,0:MOVE XB,YB:PRINT E$
650 MOVE XB,YB:PRINT A$;B$
660 MOVE XB,YB-30:PRINT C$;D$
670 SC=SC+40:ENDPROC
680 DEFPROCSCORE
690 VDU 4
700 PRINT TAB(3,1);"SCORE = ";SC
710 PRINTTAB(20,1)"HISCORE = ";HI
720 VDU 5:ENDPROC
730 DEFPROCCRASH
740 MOVE XS,YS:GCOL 0,1:PRINTG$;H$
750 SOUND 0,1,-3,8:CLG
760 *FX 15,0
770 PROCEND:ENDPROC
780 DEFPROCEND
790 PRINTTAB(8,10);"YOUR SCORE WAS *** ";SC;" ***"
800 IF SC>HI HI=SC
810 PRINTTAB(4,12);"THE HIGH SCORE IS *** ";HI;" ***"
820 PRINTTAB(10,16);"ANOTHER GAME (Y/N) ?"
830 *FX 15,0
840 Z$=GET$
850 IF Z$="Y" SC=0:GOTO 160
860 *FX 4,0
870 CLS:VDU 4:END
880 ENDPROC
```

Astrosmash
by David Potter

```
5 CLS
[illegible]
```

Music Development
by Carol Bowerman

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Music Development

on BBC Micro

Recently many music programs in which the songs are entered in musical type notation have been published Their main drawbacks are

1 Musical knowledge is essential
2 The noise channel is hard to cater for in this way
3 The numbers indicating the frequency used by the sound command are not displayed and such programs can not be used to develop musical effects for games etc

I thus wrote a short simple program which allowed the easy manipulation of sound effects

The menu on line 30 allows songs to be entered and notes deleted using option 1, songs to be played option 2 or displayed option 3

In enter mode the channel number the frequency and the duration are entered (loudness is fixed at −5) in that order To exit enter mode a dummy note 9 0 0 is entered

To delete notes enter edit mode (option 1) and then choose the *Del* option Respond to the prompt by indicating the number of notes to be deleted

All note synchronisation flushing and continuation controls are available The hexadecimal number for the channel should be worked out and this should be entered as the channel number after having been converted to decimal

For example to play a note immediately regardless of the queue on channels 2 and 12 loudness frequency duration is normally entered this should be entered as decimal 18, L F D

Battleships

on BBC Micro

This program is based on the well known game of Battleships and runs on both the Model A and B Four naval ships are placed on a 10x10 square by the operator and the computer randomly places it s own fleet

Ship positions

The positions of your ships are shown on the screen, and then you and the computer alternatively try to sink each other s ships

When one of your ships has been destroyed it is replaced by an asterisk and a list is maintained at the top of the screen as to what has been sunk

The computer begins at a random number working its way around the board systematically, never firing upon the same square twice Inbuilt checks are made to ensure that no two ships are placed on the same square

```
10 REM ************************
20 REM *                      *
30 REM *   B A T T L E S H I P S  *
40 REM *                      *
50 REM *          B Y         *
60 REM *                      *
70 REM *      M A T T H E W   *
80 REM *                      *
90 REM *       K E E L I N G  *
100 REM *                     *
110 REM ***********************
120 CLS
130 CLS
140 PRINTTAB(0,2)"ON A GRID TEN BY TEN YOU CAN PLACE THREE SHIPS
 AND A SUBMARINE .EG. 9 ACROSS AND 2 UP WOULD BE TYPED IN AS
 '9,2'. WHEN THE POSITIONS HAVE BEEN CHOSEN THE GRID WILL BE
 DRAWN AND THE SHIPS PLOTTED."
150 PRINTTAB(0,9)"WHERE DO YOU WANT TO PLACE THE ...."
160 PRINTTAB(0,11)"SUBMARINE  "
170 VDU 11:VDU 9:VDU 9 VDU 9:VDU 9:VDU 9:VDU 9:VDU 9:VDU 9:VDU 9:
 VDU 9:VDU 9 VDU 9
180 INPUT S,SS
190 IF S > 10 OR SS > 10 PRINT"PLEASE STATE THAT AGAIN":INPUT S,SS:
 GOTO 190
200 PRINT"BATTLESHIP "
210 VDU 11:VDU 9:VDU 9:VDU 9:VDU 9:VDU 9:VDU 9:VDU 9:VDU 9:VDU 9:
 VDU 9:VDU 9:VDU 9
220 INPUT B,BB
230 IF B = S AND BB = SS PRINT"YOU HAVE GOT THE SUBMARINE THERE":
 VDU 7:GOTO 220
240 IF B > 10 OR BB > 10 PRINT"PLEASE STATE THAT AGAIN":INPUT B,BB:
 GOTO 240
250 PRINT"FRIGATE   "
260 VDU 11:VDU 9:VDU 9:VDU 9:VDU 9:VDU 9:VDU 9:VDU 9:VDU 9:VDU 9:
 VDU 9:VDU 9:VDU 9
```

```
270 INPUT F,FF
280 IF F = S AND FF = SS PRINT"YOU HAVE GOT THE SUBMARINE THERE":
 VDU 7:GOTO 270
290 IF F = B AND FF = BB PRINT"YOU HAVE GOT THE BATTLESHIP THERE":
 VDU 7:GOTO 270
300 IF F > 10 OR FF > 10 PRINT"PLEASE STATE THAT AGAIN":INPUT F,FF
 GOTO 300
310 PRINT"AIRCRAFT CARRIER"
320 VDU 11 VDU 9 VDU 9 VDU 9:VDU 9:VDU 9:VDU 9:VDU 9:VDU 9:VDU 9:
 VDU 9:VDU 9 VDU 9 VDU 9 VDU 9:VDU 9 VDU 9:VDU 9:VDU 9
330 INPUT A,AA
340 IF A = S AND AA = SS PRINT"YOU HAVE GOT THE SUBMARINE THERE":
 VDU 7:GOTO 330
350 IF A = B AND AA = BB PRINT"YOU HAVE GOT THE BATTLESHIP THERE":
 VDU 7:GOTO 330
360 IF A = F AND AA = FF PRINT"YOU HAVE GOT THE FRIGATE THERE":
 VDU 7:GOTO 330
370 IF A > 10 OR AA > 10 PRINT"PLEASE STATE THAT AGAIN":INPUT A,AA
 GOTO 370
380 LET SC = RND(10)
390 LET SSC = RND(10)
400 LET BC = RND(10)
410 LET BBC = RND(10)
420 IF BBC = SSC AND BC = SC GOTO 400
430 LET FC = RND(10)
440 LET FFC = RND(10)
450 IF FC = SC AND FFC = SSC GOTO 430
460 IF FC = BC AND FFC = BBC GOTO 430
470 LET AC = RND(10)
480 LET AAC = RND(10)
490 IF AC = SC AND AAC = SSC GOTO 470
500 IF AC = FC AND AAC = FFC GOTO 470
510 IF AC = BC AND AAC = BBC GOTO 470
520 MODE 1
530 FOR A = 0 TO 650 STEP 65
540 MOVE 0,0
550 DRAW 650,0
560 NEXT
570 FOR B = 0 TO 650 STEP 65
580 MOVE B,0
590 DRAW B,650
600 NEXT
610 COLOUR 1
620 PRINTTAB(A*2-1,(10-AA*2-2)+26)"A"
630 LET P = 2
640 PRINTTAB(S*2-1,(10-SS*2-2)+26)"S"
650 PRINTTAB(B*2-1,(10-BB*2-2)+26)"B"
660 PRINTTAB(F*2-1,(10-FF*2-2)+26)"F"
670 D = RND(99) + 10:U = 0
680 FOR G = 10 TO 109
690 U = U + 1
700 IF U > 100 U = U - 99
710 C = U DIV 10
720 CC = U - (C * 10) + 1
730 COLOUR RND(3)
740 IF C > 10 OR CC > 10 C = C - 10 : CC = CC - 10
750 PRINTTAB(0,2)"WHERE DO YOU WANT TO SHOOT"
760 PRINTTAB(0,3)"                                       "
770 PRINTTAB(27,2)""
780 INPUT Z,ZZ
790 IF Z = SC AND ZZ = SSC PRINTTAB(0,8)"  YOU'VE HIT MY SUBMARINE":
 SC = 99:SSC = 99:SOUND 0,-15,6,10
800 IF Z = BC AND ZZ = BBC PRINTTAB(0,9)"  YOU'VE HIT MY BATTLESHIP"
 :BC = 99:BBC = 99:SOUND 0,-15,6,10
810 IF Z = FC AND ZZ = FFC PRINTTAB(0,10)"  YOU'VE HIT MY FRIGATE":
 FC = 99:FFC = 99:SOUND 0,-15,6,10
820 IF Z = AC AND ZZ = AAC PRINTTAB(0,11)"  YOU'VE HIT MY AIRCRAFT
 CARRIER": AC = 99:AAC = 99:SOUND 0,-15,6,10
830 IF SC = 99 AND SSC=99 AND BC= 99 AND BBC= 99 AND FC= 99 AND
 FFC= 99 AND AC= 99 AND AAC= 99 PROCC
840 IF C = S AND CC = SS PRINTTAB(0,4)"  I'VE HIT YOUR SUBMARINE":
 PRINTTAB(C*2-1,(10-CC*2-2)+26)"*":S = 99:SS = 99:
 SOUND 0,-15,6,10
850 IF C = B AND CC = BB PRINTTAB(0,5)"  I'VE HIT YOUR BATTLESHIP":
 PRINTTAB(C*2-1,(10-CC*2-2)+26)"*":B = 99:BB = 99:
 SOUND 0,-15,6,10
860 IF C = F AND CC = FF PRINTTAB(0,6)"  I'VE HIT YOUR SUBMARINE":
 PRINTTAB(C*2-1,(10-CC*2-2)+26)"*":F = 99:FF = 99:
 SOUND 0,-15,6,10
870 IF C = A AND CC = AA PRINTTAB(0,7)"  I'VE HIT YOUR AIRCRAFT
 CARRIER":PRINTTAB(C*2-1,(10-CC*2-2)+26)"*":A = 99:AA = 99:
 SOUND 0,-15,6,10
880 IF S = 99 AND SS =99 AND B = 99 AND BB = 99 AND F = 99 AND
 FF = 99 AND A = 99 AND AA = 99 PROCH
890 NEXT
900 END
910 DEF PROCC
920 CLS
930 PRINTTAB(10,10)"YOU'VE WON"
940 GOTO 1010
950 ENDPROC
960 DEF PROCH
970 CLS
980 PRINTTAB(10,10)"I'VE WON"
990 GOTO 1010
```

turn to next page

```
1000 ENDPROC
1010 TIME = 0
1020 REPEAT
1030 UNTIL TIME > 400
1040 CLG
1050 CLS
1060 PRINTTAB(0,10)""
1070 INPUT"DO YOU WANT ANOTHER GO?"A$
1080 IF A$ = "YES" OR A$ = "Y" GOTO 10
1090 IF A$ = "NO" OR A$ = "N" GOTO 1110
1100 GOTO 1040
1110 FOR A = 0 TO 10
1120 PRINT"[illegible]"
1130 NEXT
1140 TIME = 0:REPEAT:UNTIL TIME > 100:CLG
1150 CLS
```

Battleships
by Matthew Keeling

Scribble

on Spectrum

We've all seen *Draw* programs for the ZX81 and Spectrum these usually involve a constant velocity cursor drawing straight lines. This program, however, operates on an entirely different principle.

When a cursor key (1→9) is pressed, an acceleration is applied to the cursor in the specified direction (fig 1). Thus the longer a key is pressed, the faster the cursor moves.

Once the cursor has acquired momentum you can apply acceleration at an angle to the direction of movement, causing it to curve around. By manipulating the accelerations carefully you can create a scribble-like design of loops and curves.

If you wish to halt the cursor dead (e.g. if it is heading towards the screen edge too fast to stop), push key 0.

Once 240 moves have been made the screen will go blank and your design will be re-traced at high speed — an effect which looks very much like a pen scribbling on the screen.

Fig. 1

```
7 8 9
 \|/
4-5-6
 /|\
1 2 3
```

Cursor directions
5 lets the cursor carry on in a straight line
0 stops the cursor dead

Variables
X and Y — displacements for *Draw* in line 40; these act like velocity component vectors
P(2,240) — holds successive x & y values to be re-drawn in the loop starting at line 100
W — holds the *Inkey$* value for cursor control

```
10 PLOT 110,80 : LET x=0 : LET y=0
11 DIM p(2,240)
20 FOR c=1 TO 240
30 IF INKEY$="" THEN LET w=5 : GO TO 60
40 IF INKEY$ >"" THEN LET w=PEEK 23560-48 : DRAW x,y
45 LET p(1,c)=x : LET p(2,c)=y
60 LET x=x+(w=3 OR w=6 OR w=9)-(w=1 OR w=4 OR w=7)
65 LET y=y+(w=7 OR w=8 OR w=9)-(w=1 OR w=2 OR w=3)
70 IF INKEY$="0" THEN LET x=0 : LET y=0
80 PAUSE 2
90 NEXT c
95 CLS
97 PLOT 110,80
100 FOR d=1 TO 240
110 DRAW p(1,d),p(2,d)
120 NEXT d
```

Scribble
Anonymous

Holocaust

on Spectrum

This game tests one's tactics under pressure as well as one's quick reactions. Instructions are supplied in the program.

Program notes
The array a(10,2) contains the positions of the enemy tanks.
5-60 set up screen and variables
70-135 move tanks and introduce various checks
500-660 aim, shoot and check bombs
1000-1230 instructions.
As the instructions are rather lengthy they can be omitted. I preferred to save time but this will detract from the visual presentation.

```
  1 GO SUB 1000
  5 LET sc=0
 10 DIM a(10,2)
 20 FOR f=1 TO 10: LET a(f,1)=f+0: LET a(f,2)=20: NEXT f
 30 FOR f=1 TO 21: PRINT AT f,0;"[illegible]";AT f,31;"[illegible]": NEXT f
 35 PRINT AT 1,0;"[illegible]"
 40 PRINT AT 21,0;"[illegible]"
 50 FOR f=1 TO 100: PRINT AT RND*15+2,RND*22+8;"[illegible]": NEXT f
 60 FOR f=1 TO 8: PRINT AT RND*18+2,RND*5+0;"C": NEXT f
 70 FOR e=1 TO 10: LET f=e
 71 PRINT AT 2,0;"[illegible]";AT 4,0;"[illegible]";AT 8,0;"[illegible]"
 72 PRINT AT 0,4;"U"
 73 PRINT AT 10,0;"[illegible]";AT 12,0;sc
 74 IF sc>=10 THEN GO TO 800
 75 IF a(f,2)=0 THEN NEXT e: GO TO 70
 80 PRINT AT a(f,1),a(f,2);" "
 90 LET a(f,2)=a(f,2)-1
100 IF a(f,1)>2 THEN IF a(f,1)<20 THEN LET a(f,1)=a(f,1)-1: IF RND>.5 THEN LET a(f,1)=a(f,1)+2
105 IF RND<.75 THEN LET a(f,2)=a(f,2)-1
110 IF SCREEN$ (a(f,1),a(f,2))="[illegible]" THEN LET a(f,2)=0: BEEP .2,0: LET sc=sc+1: GO TO 140
120 IF SCREEN$ (a(f,1),a(f,2))="C" THEN LET b=b-10: BEEP .5,20: FOR t=32 TO 144: PRINT AT a(f,1),a(f,2);CHR$ t: NEXT t: PRINT AT a(f,1),a(f,2);"[illegible]": LET sc=sc+1: LET a(f,2)=0: GO TO 140
130 IF a(f,2)<=6 THEN GO TO 400
135 PRINT AT a(f,1),a(f,2);"[illegible]"
140 IF INKEY$="1" THEN GO TO 500
150 NEXT e: GO TO 70
400 PRINT AT 10,10; FLASH 1;"WE WIN"
405 PRINT AT a(f,1),a(f,2);"[illegible]"
410 FOR h=1 TO 200: NEXT h: PRINT AT 21,0;"Press any key"
420 IF INKEY$="" THEN GO TO 420
430 RUN
500 PRINT AT 0,4;" "
510 LET b=b-1: IF b<0 THEN GO TO 700
520 FOR f=0 TO 30
530 PRINT AT 0,f-1;" U"
540 FOR d=1 TO 5
545 IF INKEY$=" " THEN GO TO 570
550 NEXT d: NEXT f
560 LET f=10
570 FOR u=1 TO 90: NEXT u: FOR s=2 TO 20
580 PRINT AT s,f;"[illegible]"
590 FOR d=1 TO 5: IF INKEY$=" " THEN GO TO 600
595 NEXT d: PRINT AT s,f;" ": NEXT s
598 LET s=20
600 IF SCREEN$ (s,f)="[illegible]" THEN BEEP .2,0: GO TO 650
605 IF SCREEN$ (s,f)="C" THEN LET b=b-10: FOR t=32 TO 144: PRINT AT s,f;CHR$ t: NEXT t: PRINT AT s,f;"[illegible]";AT 0,f;" ";AT s,f: BEEP .5,50: GO TO 150
610 FOR q=1 TO 10: PRINT AT s,f;"[illegible]";AT s,f;"[illegible]": NEXT q: PRINT AT s,f;" ": LET j=0: LET f=0: GO TO 150
650 FOR q=1 TO 10: PRINT AT s,f;"[illegible]": IF a(q,1)=s AND a(q,2)=f THEN LET sc=sc+1: LET a(q,2)=0
660 PRINT AT s,f;"[illegible]": NEXT q: GO TO 510
700 PRINT AT 10,10; FLASH 1;"NO BOMBS WE WIN"
710 GO TO 410
800 PRINT AT 10,10; FLASH 1;"YOU WIN": GO TO 410
1000 CLS
1010 PRINT "   NUCLEAR HOLOCAUST"
1020 PRINT "This war game is set in the near future and nuclear war has been declared throughout the world. You have a high position in the forces of peace, for you operate one of the bombing sites. Your task is to destroy the oncoming Russian tanks by bombing them by either direct hits or by forcing"
1030 PRINT "them to move into a nuclear footprint. If they move into a foot print then they are killed by the high radiation levels. If they hit one of your citys then some of your bomb supply will be cut off. If the tanks manage to cross the war area and hit your defences then you will be killed"
1040 PRINT FLASH 1;"PRESS ANY KEY"
1050 PAUSE 0: CLS
1060 PRINT "BEWARE, your bomb supply is limited"
1070 PRINT FLASH 1;"PRESS ANY KEY"
1080 PAUSE 0: CLS
1090 PRINT "CONTROLS"
1100 PRINT "To drop a bomb you must first press 1 to start the horiz sight, space to stop it and to start the vert and space to stop that one to drop a bomb"
1110 PRINT FLASH 1;"PRESS ANY KEY": PAUSE 0: CLS
1120 PRINT "SIGNS"
1130 PRINT "[illegible]=nuclear footprint"
1140 PRINT "[illegible]=Russian tank"
1150 PRINT "C=your city"
1160 PRINT "[illegible]=your defence line"
1170 PRINT "U=your horiz sight"
1180 PRINT ">=your vert sight"
1190 PRINT FLASH 1;"PRESS ANY KEY"
1200 PAUSE 0: CLS
1210 INPUT "LEVEL 1-9,9=easy ?";l
1211 LET l=INT l: IF l<1 OR l>9 THEN GO TO 1210
1220 LET b=l*10
1230 CLS: RETURN
```

Holocaust
by Nick Wilson

In this slot various contributors explore different aspects of the ZX Spectrum

Charted by numbers

Malcolm Davison explains how to draw bar-charts to illustrate your programs.

This is a general purpose graph (or more accurately bar-chart) program which will plot one to 12 values from one to multi millions. The vertical scale is set by the highest value and can be either five or 10 units in value (see examples).

The graph can be given different colours and a title up to 30 letters long. If any values to be charted are negative, the appropriate bar is printed in red but above the x axis.

While the program was written to handle financial information, it would not be difficult to change the units to 'sheep', 'tons' or anything else. The '£' sign and scale of value is given in lines 2157 and 2160. As an alternative to the numbers 1-12 along the x axis, a routine to put the month's initials 'JFMA   could be written.

One application for this program would be for a marketing or sales lecture where the graphs required as a visual aid could be stored on tape and loaded as needed. A program to handle the searching and loading could be employed, but by making careful use of the tape counter on the tape recorder and using *Load* graph name *Screen*, such a program should not be necessary. The speed of access and display should be greatly enhanced by the new microdrive.

The other use of the program would be to print out graphs for use in reports, although much of the impact is lost through the lack of colour. The title of the graph should be printed in true video rather than inverse to make it easier to read (delete *Inverse* 1 in line 2180).

The colour check, lines 1040, 1070 and 1110 tests the input colour value. It does not allow the use of red as a *Paper* or *Ink* colour or white as a *Paper* colour and prevents defining the *Paper* and *Ink* colours as the same colour. The input values are stored in a numeric array (lines 2071, 2075) after being checked as numeric inputs in the validation routine (3000-3050).

Lines 2080 to 2095 search for the largest input value and lines 2115 and 2120 decide whether a 10 unit or five unit vertical scale should be used. (The flag 'Five=1' indicates the latter.)

Two bar widths are available, depending upon whether there are more than six input values (the variable N stores the number input values). Lines 2210 to 2280 handle the six or less values and lines 2207 to 2240 the seven to 12 values. Lines 2285 and 2215 change the colour of the bar to red if the value is negative.

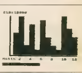
To determine the height of the bar, lines 2210 and 2280 work out the proportion of 113 plot positions represented by the input value — the maximum value of the vertical scale being represented by *Range* previously determined in lines 2201 and 2205.

```
   1 REM "graph"
   2 REM © M.Davison
   3 REM
   5 INK 7: BORDER 0: PAPER 0: CLS
1000 INPUT "How many graph values? (1-12)",b$
1005 GO SUB 3000: IF error=1 THEN GO TO 1000
1010 LET N=VAL b$
1020 IF VAL b$>12 OR VAL b$<1 THEN GO TO 1000
1030 INPUT "What colour paper? ",a$
1040 IF CODE a$<48 OR CODE a$>55 OR CODE a$=50 THEN GO TO 1030
1050 PAPER VAL a$
1060 INPUT "What colour ink?",b$
1070 IF CODE b$<48 OR CODE b$>55 OR CODE b$=50 THEN GO TO 1060
1080 IF a$=b$ THEN GO TO 1060
1090 INK VAL b$
1100 INPUT "What colour border? ",b$
1110 IF CODE b$<48 OR CODE b$>55 OR CODE b$=50 THEN GO TO 1100
1120 BORDER VAL b$
1130 CLS
2050 LET FIVE=0: LET HIGHEST=0: LET RANGE=0: LET B$=""
2055 INPUT "What is the title of the graph? (max. 30 letters) ",R$
2060 IF LEN R$<31 THEN GO TO 2063
2061 BEEP .1,20: BEEP .1,10: CLS : PRINT AT 2,6; FLASH 1;"Sorry too many letters": PRINT AT 3,10; FLASH 1;"Try again": PAUSE 300: FLASH 0: CLS : GO TO 2055
2063 DIM V(12)
2065 REM
2066 REM ************************
2067 REM INPUT GRAPH VALUES
2068 REM ************************
2069 REM
2071 FOR Q=1 TO N
2072 INPUT "Enter value ",b$: GO SUB 3000
2073 IF error=1 THEN GO TO 2072
2074 LET V(Q)=VAL b$: NEXT Q
2075 GO TO 2080
2076 REM ************************
2077 REM SCALE OF INPUT?
2078 REM ************************
2079 REM
2080 LET HIGHEST=V(1)
2081 FOR A=2 TO N
2083 IF V(A)=0 THEN GO TO 2088
2085 IF V(A)>HIGHEST THEN GO TO 2090
2088 NEXT A
2089 GO TO 2100
2090 LET HIGHEST=V(A): GO TO 2088
2100 FOR S=1 TO 9
2110 IF HIGHEST/(10^S)<=10 THEN GO TO 2120
2117 NEXT S: PRINT "Input value too high": STOP
2120 IF HIGHEST/(10^S)<=5 THEN LET FIVE=1
2130 IF HIGHEST/(10^S)<=5 THEN LET FIVE=1
2132 REM
2133 REM ************************
2134 REM DRAW AXES
2135 REM ************************
2136 REM
2140 FOR Q=28 TO 31: PLOT INK 7,Q,38: DRAW INK 7,0,117: NEXT Q
2142 FOR Q=35 TO 38: PLOT INK 7,28,Q: DRAW INK 7,202,0: NEXT Q
2144 REM
2145 REM ************************
2146 REM ADD GRAPH DETAILS
2147 REM ************************
2148 REM
2155 IF FIVE=0 THEN GO TO 2158
2157 PRINT INK 7;AT 1,1;"£5x";10^S: GO TO 2162
2158 PRINT INK 7;AT 1,1;"£10x";10^S
2162 PRINT INK 7;AT 16,2;"0"
2163 IF N>6 THEN GO TO 2400
2170 FOR Q=0 TO (N-1): PRINT INK 7;AT 18,5+(Q*4);Q+1: NEXT Q
2180 PRINT INK 7;AT 20,1; INVERSE 1;R$: INVERSE 0
2185 PRINT INK 7;AT 18,1;"Month"
2190 REM
2191 REM ************************
2192 REM DRAW HISTOGRAM BLOCKS
2193 REM ************************
2194 REM
2200 IF FIVE=0 THEN GO TO 2202
2201 LET RANGE=5*(10^S): GO TO 2205
2202 LET RANGE=(10^S)*10
2205 IF N>6 THEN GO TO 2250
2207 FOR L=1 TO N
2209 IF V(L)=0 THEN NEXT L
2210 LET Y=INT ((113*ABS V(L)/RANGE)+.5)
2214 LET I=0
2215 IF V(L)<0 THEN LET I=2
2220 FOR Q=1 TO 24: PLOT INK I,Q+7+(L*32),40: DRAW INK I,0,Y: NEXT Q
2230 LET I=0: NEXT L
2240 STOP : REM END OF PROGRAM
2250 IF N<13 THEN GO TO 2270
2260 PRINT "Too many values": STOP
2270 FOR L=1 TO N
2280 LET Y=INT ((113*ABS V(L)/RANGE)+.5)
2284 LET I=0
2285 IF V(L)<0 THEN LET I=2
2290 FOR Q=1 TO 16: PLOT INK I,Q+23+(L*16),40: DRAW INK I,0,Y: NEXT Q: LET I=0: NEXT L
2300 STOP
2400 INK 7: FOR Q=1 TO N/2: PRINT AT 18,3+(Q*4);Q*2
2410 NEXT Q
2420 GO TO 2180
2995 REM
2996 REM ************************
2997 REM     Numeric validation
2998 REM ************************
2999 REM
3000 LET error=0
3010 FOR x=1 TO LEN b$
3015 IF CODE b$(x)=43 OR CODE b$(x)=46 THEN GO TO 3030
3020 IF CODE b$(x)<48 OR CODE b$(x)>57 THEN LET error=1
3030 NEXT x
3050 RETURN
```

25x100

0

Month1 2 3 4 5 6





Tony Bastable presenter of Thames TV's Database programme

Chimp champ chit-chat show

Paul Kriwaczek *looks at Database – Thames TV's micro programme*

Database is a half hour programme about microcomputers produced by Thames TV. The first episode was shown on Tuesday, October 12 at 11 30 pm

At that time of night it has to be a try on ITV wants to see if its info tech version of Wheelbase can pull an audience. On the showing of the first episode in the series my feeling is that they have a winner

Of course it is not anything like the BBC's Computer Programme but then it was not intended to be. Database is simply to the micro what Wheelbase is to the motor. Tony Bastable and all

The programme started with a visit to the appalling Milton Keynes house that palace of misplaced technology where it seems you cannot even turn on the lights without having to twiddle some infernal remote control. The central heating programmer in normal houses a small and unobtrusive box, has here grown like a triffid, out of control all over a wall until it looks like something that fell off the Tardis. But then it allows you to program the heating a year ahead. It doesn't however, provide a weather forecast.

On the interactive video link, one is invited to participate in a council meeting apparently under the control of a group of raving madmen

The programme thank goodness refused to take all this too seriously and allowed itself to poke gentle fun at some of the excesses. Under what circumstances Bastable wanted to know would one need the facility for opening and closing the front room curtains by telephone link from abroad?

The Milton Keynes house is incorporated in a cable television network a fact which led elegantly on to the next item — cable television. With excellent topicality, the concerned the publication of the Hunt report on cabling-up Britain. There was an intelligent interview with Lord Hunt differing from the news reports of the day by concentrating on the technical implications of the document — coaxial cable versus glass fibre and the provision of interactive services

Then we had the sketch. This was Lion House getting its own back on the Computer Programme by demonstrating that Roy Kinnear is not their only salesman. A personable young man behind the counter performed admirably with the hearty embarrassment of the well rehearsed adlib dispensing jolly and perhaps a little optimistic advice on educational software for the TI micro. 'But is it always like this' came the cry, and so quick as a flash over we went to our resident expert

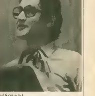
Dr Michael Thorne is a truly wonderful boffin heavily bearded and with some kind of nervous twitch of the eyes inhabiting a lunatic set full of giant resistors and pcb tracks. As he addressed us on the subject of the low standard of some commercial software he was accompanied by a sort of squeaking noise that made me at first think he had mice about his person

The joke turned out to be on me because when the camera pulled back it was to reveal the presence in the studio of a chimpanzee — the resident software quality control expert. The idea was an ironic reversal of Turing's test — any programme that cannot tell there is a chimpanzee and not a human at the other end of the joystick cannot be all that bright. Next week said Dr Thorne he would be looking at the hardware. Whether the chimp had a long-running contract too he did not reveal

There followed from the *Personal Computer World* show earlier in the year a dutiful interview with two computer clubmen to show that computer enthusiasts are just ordinary people. People simply do not come more ordinary than this pair

And finally for the reading of the latest micro news we were back in the studio Studio? The set appeared to be a cross between Carl Sagan's Cosmos spaceship and something out of the stills under the Star Trek credits all screens points and cubic curves. The presenter sat down at what was supposed to be a desk. Being Tony Bastable I expected him to drive it away

All in all a most enjoyable show. I wish ITV well with it. And if I am awake that late on Tuesday nights I shall continue to watch. So should you



Paul Kriwaczek

Reviews

Whats happening

SUFFOLK ZX81 USERS interested in setting up a software library should telephone P Cockerton or R Rees on Bury St Edmunds 4312 or 4867 (after 5 pm)

THE AUSTRALASIAN ZX USERS NEWSLETTER is published nine times per year. Membership is open to all ZX users. Contact Paul Jansen PO Box 397 Dapto NSW 2530 Australia

MICRO-MART '82 will be held at St Francis School Hall Bournville Lane Birmingham on November 13. The show including club stands retail exhibitors and a bring and buy stall will be open from 10 am to 6 pm tickets 50p

Machine Code

Ian Stewart and Robin Jones present a new series for beginners

Registering the bits and bytes

8 bits	8 bits	8 bits	8 bits	
A	F	A'	F'	
B	C	B'	C'	general
D	E	D'	E'	purpose
H	L	H'	L'	registers
main set		alternate set*		

	16 bits	
IX		special-
IY		purpose
SP		registers
PC		

Here is the register organisation

Ignore the alternate set for the moment

The registers appear in pairs indicating that they may be used either as 8-bit or 16-bit registers For instance we can refer to the *B*-register (8 bits) or the *C* register (8 bits) or the *BC* register (16 bits) The *B C D E H* and *L* registers can all be used in this way (but only in pairs *Bc*, *De* and *Hl*) but the *A* and *F* registers are strictly 8 bit registers and cannot be combined For the 16-bit pairs the senior byte is the left hand one (*B D* and *H*) as you would expect

There are two index registers *Ix* and *Iy* a stack pointer (*Sp*) and program counter (*Pc*) Any of the 16-bit general-purpose register pairs (*Bc*, *De* or *Hl*) can be used for indirection but for simplicity, we shall always use *Hl* for this purpose

Load

Let s look at the *Load (Ld)* operation as an example of the 8-bit group It s very like the *Ld* instruction in our imaginary machine except that two extra addressing modes are allowed *register-to-register* and *immediate* That gives a total of five addressing modes with *direct indirect* and *indexed* available as before

Direct addressing is much the same as our imaginary equivalent, except that since there is more than one register we have to specify which register we want loaded

```
LD A (0F1C)
```

This loads the contents of 0F1C into the *A*-register Note that by convention, the movement is from right to left, so that we can write

```
LD (0F1C) A
```

and mean 'copy the contents of the *A*-register into 0F1C Actually the *A* register is the only *8-bit* register which can be directly addressed

Indirect addressing is also straightforward Since we are going to standardise on the *Hl* for indirection, the instruction format is

```
LD A (HL)
```

which means ' load the *A*-register *through* (ie from the address contained in) the *Hl* register' To pass data in the opposite direction we could have

```
LD (HL) A
```

which puts the contents of A into the address *contained in Hl* Registers other than A are allowed for this instruction

Indexed addressing Here we need to indicate which index register is in use, and the amount of the offset

```
LD A (IX + 2E)
```

Note that in direct addressing we showed an address of 4 hex digits because 16 bits (2 bytes) are allowed for the address The offset value in an indexed address instruction must be held in 1 byte however so we have only shown two hex digits

Register-to-register We can transfer data between registers like this

```
LD D B
```

which means "load the contents of *B* into *D*"

Immediate Here data itself, rather than the address of data, is placed in the address field So we can write

```
LD B 07
```

to mean "put the number 7 in *B*" Note again that the number is two hex digits since it has to be stored in the single byte of the *B*-register Note also that a *Ld* is really a *copy* — the numbers are retained in their original addresses or registers but a copy is placed at the destination

Now let s see what each of these instructions looks like in hex

1 LDA (0F1C)

First we look up the opcode for the *Ld A*, (nn) instruction (the nn indicates a general 2 byte address) This is 3A So you would expect the instruction to code as

```
3A 0F 1C
```

Unfortunately, there is a slight complication caused by the way the Z80 thinks about numbers It likes the least significant (junior) byte of an address first So we have to *swap the address bytes round*

```
3A 1C 0F
```

This is mildly annoying, but you soon get used to it It is an invariable rule for 2-byte numbers in Z80 instructions *junior byte first then senior* Hence all those *Peek X + 256 *Peek (X + 1)*s in the Sinclair *Manual*

The *Ld* (nn) A instruction has the code 32 so

LD (0F1C) becomes 32 1C 0F

2 LDA (HL)

This is easy There is no address part so it s just a 1-byte opcode Look it up and you ll find it s 7E Similarly *Ld (Hl) A* codes as 77

3 LD A (IX + 2E)

The general instruction is *Ld A (IX + d)*, *d* indicating a 1-byte displacement (in 2 s complement notation) Its code is *DD 7E* So the instruction is

```
DD 7E 2E
```

where the byte *2E* is the displacement chosen in this case

4 LD D B

No problem here again The code is 50

5 LD B 07

The opcode is 06 so the instruction is 06 07

What about arithmetic? There s an *Add* and a *Sub* instruction both of which refer to the *A* register and which may use any of the addressing modes except direct

Let s try writing a program to add the numbers 4 and 7 together This would work

```
LD A 04     [put 4 in the A reg ]
LD B 07     [put 7 in the B reg ]
ADD A, B    [add them and put the result in the A-reg ]
```

Now store the result away somewhere

```
LD (4300) A
```

Here s the program the hex code and the decimal equivalent

Program	Hex	Decimal
LD A 04	3E 04	62 04
LD B 07	06 07	06 07
ADD A B	80	128
LD (4300) A	32 00 43	50 00 67

We are left with the problem of loading this code into the ZX81 and then executing it Since we are going to do a number of machine code routines it is worthwhile writing a Basic program which loads and then executes machine code

This is fairly easy In principle all we need to do is ask the user where he wants to put the code in memory then ask for each byte of code in turn and *Poke* it into the appropriate location Then run the program calling the *Usr* function Finally *Peek* all the program locations and data area to ensure that the program is still intact and that the results are correct

Obviously it makes sense to have the data and program areas adjoining So we will adopt this convention — the data area always precedes the program area and is loaded with zeros to start with We will begin by asking the user the size of his data area (as a number of bytes)

There is one other problem According to the Sinclair *Manual* all routines called by *Usr* have to end the same way

```
LD A 1E      3E 1E         62 30
LD I A       ED 47         237 71
LD IY 4000   FD 21 00 40   253 33 00 64
RET          C9            201
```

Actually it is that final *Ret* that is crucial

If you have any machine code subroutines/tips/games, please send them to Machine Code, *Popular Computing Weekly*, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF

Reproduced from *Machine Code and better Basic* by Ian Stewart and Robin Jones (price £7 50), by kind permission of Shiva Publishing Ltd, 4 Church Lane, Nantwich, Cheshire CW5 5RQ



In the land of the Red Dragon

It is a rare accolade for a home computer to be allocated its own page in *Popular Computing Weekly.* We have decided to follow up the success of the Spectrum page with this Dragon page because

a) The Dragon is a very interesting microcomputer with a good number of new features

b) Many Dragon owners will either have no previous experience of computing or will have graduated from smaller machines such as the ZX81. To all these people many of the features of the Microsoft colour Basic used on the Dragon will seem quite peculiar at first.

c) The complexity of the Dragon and its use of the 6809 microprocessor means it will be a long time before we have all mastered all the intricacies of the machine. If we each let each other know what we discover we can all learn more quickly.

This page therefore depends on you being willing to share your discoveries with us and sending them to this page.

To start the page off we have a Flying Saucers program submitted by John Wrennel, a new Dragon owner. It shows a few of the simple peculiarities of Dragon Basic and is quite well documented

In the coming weeks we hope to run a feature on the main differences between Dragon Basic and Sinclair ZX81 and Spectrum Basic and then one by one explore, with sample programs some of the more unusual commands available to you

Flying Saucer

No separate instructions are required for this program as they will be displayed when the program is run. Any key will fire a shell

Here is a description of the structure of the program

Program notes

Lines	
10 to 15	Set screen and define ship
20 to 60	Draw ground and gun
70 to 110	Position stars
120	Delay
130 to 165	Initialise
175	Random factor for speed
170 to 210	Find a height (c) for ship
220 to 380	Movement across screen
240	Check for only one shell at a time
250	Get any key to fire
275 to 290	Check for hit
300 to 310	Destroy ship accompanied by random noise
380	Blank saucer and shell's last positions
350	Check for shell off screen
400 to 460	10 ships hit — win
500 to 550	More than 15 shots taken — lose
600 to 700	Random time warp

Variables

SH$ Defines ship gives impression of rotation
OF$ Blanks ship gives impression of rotation
S$ Shots label
H$ Hits label
CHR$ (X) Plotting Characters i.e.
60 <
79 O
62 >
32 △ (space)
246 Graphic Ground
43 + (star)
X — Horizontal position of ship
SH — Number of shots
H1 — Number of hits
N — Height of shell
SA — Number of aliens
Q — Position of alien
Z — Position of shell
C — Height of alien
F — Hit flag

```
Optional Time Warp

300 IF RND(20)=10 THEN 600
600 CLS0:GOSUB700:CLS1:GOSUB700:CLS2:GOSUB700
610 CLS3:GOSUB700:CLS4:GOSUB700:CLS5:GOSUB700
620 GOTO 5
700 FOR D=1 TO RND(5):SOUND RND(250) RND(5):NEXT D
710 RETURN


PROGRAM PROPER

FLYING SAUCERS

  5 'FLYING SAUCERS
 10 CLS 1
 15 SH$=CHR$(60)+CHR$(79)+CHR$(62):'DEFINE SHIP
 16 OF$=CHR$(32)+CHR$(32)+CHR$(32):'BLANK SHIP
 20 FOR I=480 TO 510
 30 PRINT@I,CHR$(246);:NEXT I:'DRAW GROUND
 40 FOR I=1 TO 3:PRINT@I+472,CHR$(160)
 50 NEXT I
 60 PRINT@442,CHR$(160);:PRINT@410 CHR$(79)
 65 RESTORE
 70 DATA 45,234,252,390,80,101,366
 80 FOR X=0 TO 6
 90 READ A
100 PRINT@A,CHR$(43);:'POSITION STARS
110 NEXT X
120 FOR D=1 TO 1000:NEXT D:'DELAY
130 SH=0:H1=0
140 N=0:SA=0
150 S$="SHOTS="
160 H$="HITS= "
165 PRINT@14 S$;:PRINT@08,H$;
170 R=RND(10):N=0:C=0:Z=0
175 V2=RND(150)
180 SA=SA+1
190 IF R>=7 THEN C=4:GOTO 220
200 IF R<=3 THEN C=6:GOTO 220
210 C=5
220 FOR X=0 TO 29
225 Q=32*C+X
228 SOUND 250,1
230 PRINT@Q,SH$;
240 IF N<>0 THEN 279
245 PRINT@410,CHR$(79)
250 A$=INKEY$:IF A$="" THEN 330
260 SH=SH+1:PRINT@21,SH;:PRINT@410," ";
270 N=N+1
275 FOR L=0 TO 2
279 Z=377-(32*N)
280 IF Z+L=Q THEN F=1:GOTO 300
290 NEXT L:GOTO 330
300 PRINT@Q-1," * ";:H1=H1+1
305 FOR V=1 TO RND(5)+5:SOUND RND(200),1:NEXT V
310 PRINT@62,H1;:IF H1=10 THEN 400
315 GOTO 340
320 PRINT@Z,CHR$(79);
330 FOR BI=1 TO V2:NEXT BI: ALIEN SPEED DELAY
340 PRINT@Q,OF$;:PRINT@Z,CHR$(32);
350 IF N=10 THEN N=0:GOTO 380
360 IF SH>20 THEN 500
370 IF F=1 THEN F=0:GOTO 170
380 NEXT X
390 GOTO 170
400 CLS(3)
410 PRINT@170 "YOU WIN.....";
420 PRINT@230,"NO  OF INVADERS= ";:PRINT@251,SA;
430 PRINT@264 "SHOTS TAKEN= ";:PRINT@277,SH;
440 PRINT@294,"HITS MADE= ";:PRINT@316,H1;
460 PRINT@480 "";:STOP
500 CLS(6):PRINT@140,"OUT OF AMMO";
520 PRINT@200,SA;:PRINT@205," ALIENS ATTACKED";
530 PRINT@230 "YOU HIT    WITH     SHOTS!";
540 PRINT@238,H1;:PRINT@246,SH-1;
550 GOTO 460
```

Peek & poke

Peek your problems to our address. Ian Beardsmore will poke back an answer,

TELL ME, INFORMATION

M J Birkinshaw of the New England College, Arundel, Sussex, writes

Q **I am a librarian and I have been asked to supply a book mentioned in your May 6 edition. Unfortunately, I cannot trace this publication, and would be very grateful for details of publisher, price, etc. The book concerned is *'The Basic Handbook (An Encyclopedia of Basic computer languages)'* By David Lien.**

A This is a problem that is starting to occur more often. A book is published in America, is imported and announced before it has had time to find its way into any of the more conventional catalogues. The book is in fact published by Compusoft Publishing, which is a sub-division of Compusoft Incorporated of San Diego, California 9211.

If you order it direct from the publishers it costs $19 95 plus $2 50 for postage and packaging. If you want it sent airmail then it is $10 postage and packing. Otherwise expect to wait 6-8 weeks. The money is payable in advance in funds drawn on a United States bank. You should send an order to 'Compusoft publishers' 1050 Pioneer Way, El Cajon, California 92020.

The ISBN is 0 932760-05-8 and the Library of Congress catalogue number is 81-67479.

By now I would guess that there is a British distributor. I would suggest that you first tried to contact either Foyles Bookshop in Charing Cross Road, London, or else Computer Bookshop in Birmingham. Computer Bookshop is at the following address: 30 Lincoln Road, Olton, Birmingham B27 6PA. Tel 021 707 7544.

BAUDOT SPEED WITH SINCLAIR

Michael Meynall of Blackheath London writes

Q **I own a ZX81 and I am moving up to buy a Spectrum. Before I order one, I would like to clear up a few points.**

Can the ZX81 programs I have be *Run* straight on to the Spectrum? Does Uncle Clive describe the machine code thoroughly in the Spectrum handbook, or hasn't he learnt his lesson yet from the ZX81? When will the microdrives be available and how much will they cost? And does the RS232 board allow you to interface the ZX81 with the Spectrum?

A This letter covers a lot of individual questions from other readers. A ZX81 program can be *Run* on a Spectrum, with exception of *Pokes* and *Peeks*, which often have different addresses. However, programs on cassette will not transfer because the baud rate of the Spectrum is very much faster than that of the 81. Also, the Spectrum scrolls automatically, so the *Scroll* function can be left out.

Unless you already have a good knowledge of machine code, the Spectrum handbook will not teach you to program in machine code. In all fairness, I feel that this is asking too much from a user manual. Machine code programming is a large subject in its own right. Nevertheless, Sinclair has learned from the ZX81 — the Spectrum manual is much better.

Latest date for the microdrives is now 1983 and not autumn 1982 as originally announced. The RS232 interface board will not allow you to connect up your ZX81 and Spectrum.

TURN THE FAT IN THE FIRE ONCE MORE

W Howard of Warbeck Drive Blackpool, writes

Q **Due to the inability of Sinclair Research to supply a ZX Spectrum within 12 weeks (not the 28 days advertised), I would be obliged if you could forward me details of the new Acorn machine, and tell me when it is due on the market. My cancellation letter is on the way to Sinclair.**

A Several people have written to me, who are upset by Sinclairs delivery times, and who consequently want to know more about the new Acorn Electron. In your particular case I fear that you have jumped out of the frying pan and into the fire. Information on the new Acorn has been hard to get hold of.

What is known is that it is a mini BBC machine, with the same graphics and 16K Ram. It is thought that it will cost about £150 and should be available early next year. Unfortunately, you still have another five months or so to wait. It must be said that Acorn never quoted a release date and the announcement must be seen in the light of the launch of the Spectrum. However it seems to me to be a little unwise to announce a new machine nine months before it can be delivered.

AT THE SIGN OF THE TETHERED GOAT

Derek Baskett of Battery Road, Cowes, Isle of Wight, writes

Q **After studying various magazines, I had finally decided to buy an Atari 400 as my first home computer. I had intended to buy a 48K or 32K machine from a mail-order company. Then I saw your *Peek and Poke* dated September 23, where you said that the Atari 400 is only capable of 16K Ram.**

I have seen a number of advertisements for 32K and 48K Atari 400s and find it hard to believe that these companies are ripping everyone off. Does this mean that all the expanded Rams are going to be troublesome? Or is it a ploy by Atari to entice people to buy the more expensive Atari 800? There is a lot of software for a 32K or 48K Atari 800. Would I be able to run this on an expanded 400?

Could you also tell me if the Atari 410 is the only cassette player that can be used with the Atari 400?

A Companies like Maplin which offer a memory modification have too good a reputation to lose by so blatantly ripping anyone off. If you bought a 32K or a 48K Atari from an independent manufacturer, then any Atari program up to your memory limit will run. If they do not then check with whoever you buy the machine from that they offer their own guarantee.

The problem stems from the fact that the CPU in the Atari is capable of working with up to 64K of memory. An independent manufacturer will simply wire up the control lines for the other 16K or 32K. It is a situation more commonly found in the ZX end of the computer market, where an independent manufacturer steps in to fill a gap in the market, which has been created by the original manufacturer not supplying what the customer wants.

As to whether this is a deliberate ploy by Atari or not well, I do not think that they would want you to buy a 48K 400 as opposed to their own 48K 800. With Atari you are tied far more to their own products than you are with some other home computers but they can usually supply what you want when you want it, something that cannot always be said for other computer manufacturers.

As far as I know you have no choice other than the 410 cassette deck, and I cannot foresee an independent bringing out an alternative model at the moment.

A PENNY FOR THE GUY, SIR. A PENNY

G Archer of Tatsfield, near Westerham, Kent writes

Q **I am the proud owner of a Vic20. I have just read your review of the new Commodore 64. I am very impressed with what I read, I would like to know if a Vic20 can be uprated to the new Commodore 64 specifications? Would it be exactly the same and how much would it cost? Could it be done by sending it to the Commodore factory, or could it be done by a Commodore dealer?**

A In short I'm afraid that it cannot be done. The new Commodore 64 is a very different animal to the Vic20. A close reading of the review with a pen and paper on hand will reveal quite a long list of extras and improvements over the Vic20. I have not seen inside the machine but the PCB must be different, and the memory mapping certainly is.

The 64 is clearly aimed somewhere up-market of the Atari, and even the BBC model B. Remember it can accept a second microprocessor which makes CP/M possible and *Run Pet* software. This puts it very clearly into the small business as well as the home category. Such features are too different to be overcome by conversion. So if you want one, I suggest that you start saving now.

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ANCIENT ALGORITHMS PUZZLE NO 29 by Tony Roberts

Solution to Puzzle No 24

This algorithm presents a method for converting binary numbers (represented by Tooth = 1 Hole = 0) into their decimal equivalents. In the jawbone illustrated in Issue No 24 the value was 10110111001 or 1465. The largest binary number — 11111111111111 — that can be converted using the alligator jawbone is $2^{14} + 2^{13} + 2^{12} \ldots 2^1$ — which is 32 766.

A computer program to do the same thing might be

```
10 S=L=Y=0
20 PRINT "Input jawbone number (Tooth = 1 Hole = 0)"
30 INPUT J$
40 L=LEN J$
50 Y=Y+1
60 IF MID$(J$,Y,1)="1" THEN S=S+1
70 IF Y=L THEN 130
80 S=2*S
90 Y=Y+1
100 IF MID$(J$,Y,1)="0" THEN 70
110 S=S+1
120 GOTO 70
130 PRINT "Decimal equivalent of jawbone binary number ";S
140 END
```

In the helpful advice category were the remarks by entrants that (a) binary number conversion was much more stimulating to the cave person than fabricating alligator tooth necklaces and (b) crocodiles were not as useful as alligators since they have fewer teeth and therefore smaller bytes.

Winner of Puzzle No 24

The winner is L Morris, Longacres Drive, Whitworth, Rochdale, Lancs who receives £10.

A.R.T.H.U.R.

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